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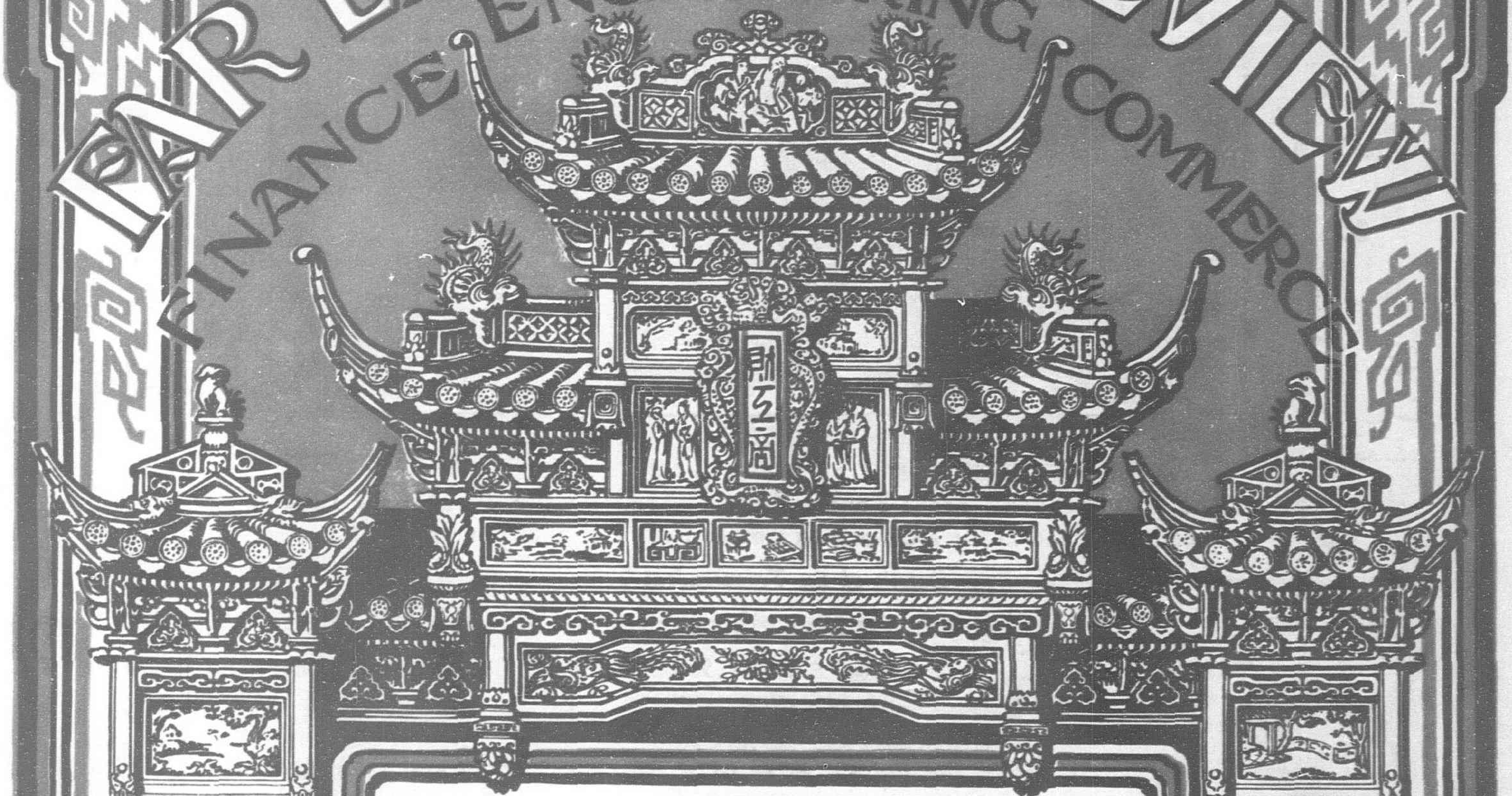

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T. V. SOONG'S FINANCIAL POLICY

By George E. Sokolsky

AMERICAN INVESTMENTS IN THE FAR EAST

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Vol. XXV
August, 1929
No. 8

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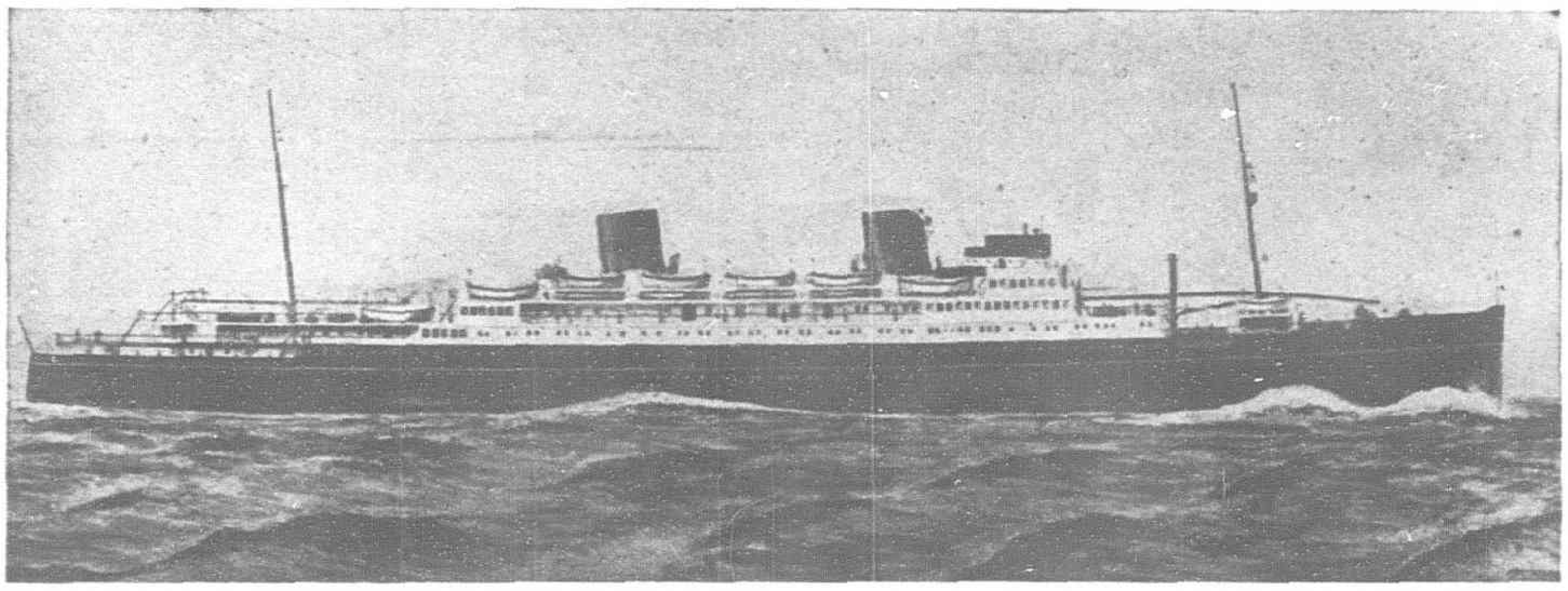

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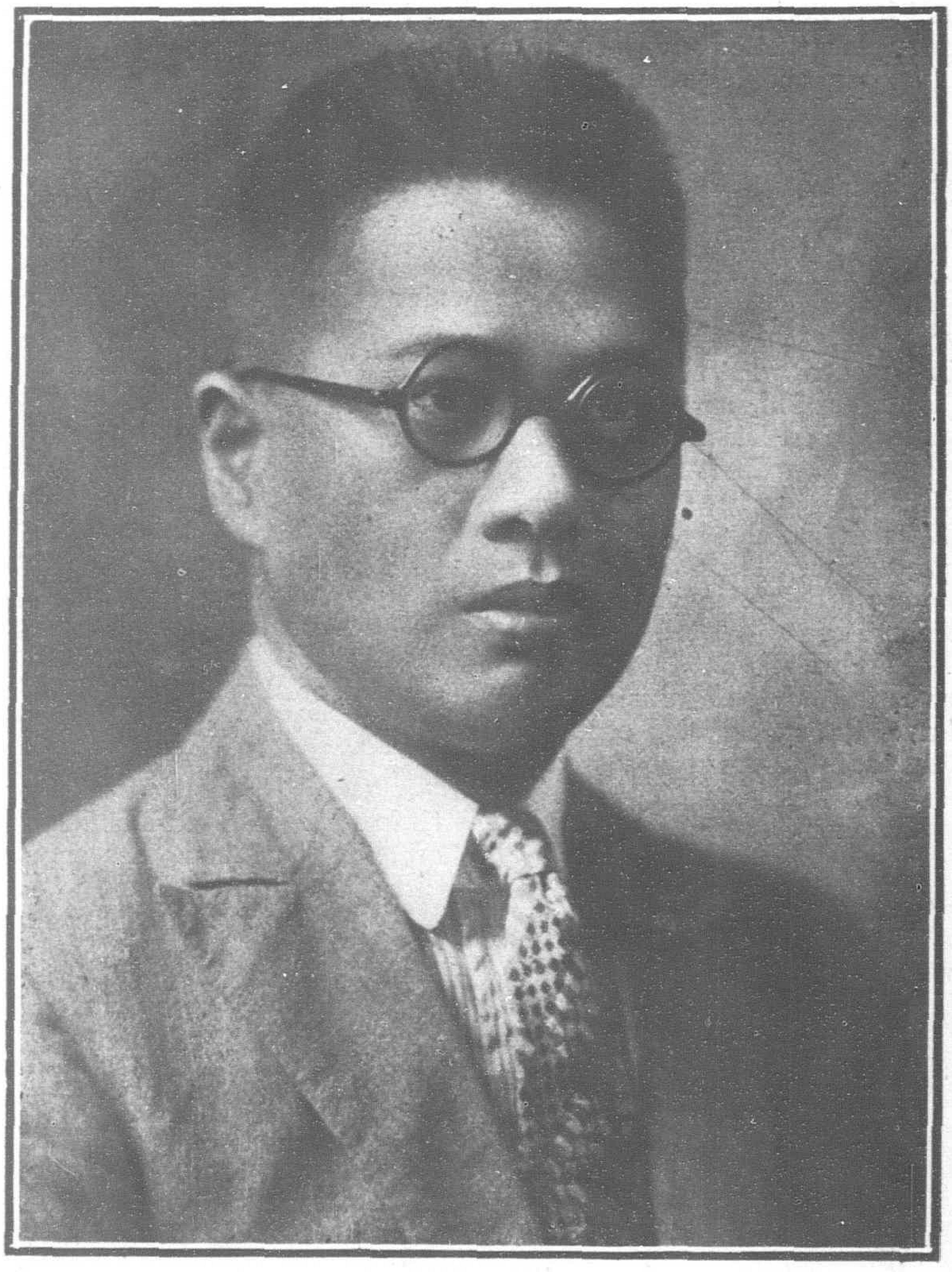
T. V. Soong's Financial Policy

The Significance of Mr. T. V. Soong's Resignation in China's Reconstruction: The Foreign Loan Policy of the Nanking Government: Public Supervision of Finances A Necessity: A Definite Policy Is Needed

By George E. Sokolsky

No official of Nationalist China commands the hearty respect and support of foreigners as does Mr. T. V. Soong, the Minister of Finance, who has given China an able administration during a period of constant difficulties. Mr. Soong has met financial problems realistically, so that foreign taxpayers have known exactly what their rights and obligations were. The result has been that, whereas in the not very distant past, foreigners and various fiscal agencies of national and provincial governments have been in conflict, since the advent of Mr. Soong there has been business on a business basis, from which everyone has benefitted. The Soong-MacMurray Treaty, which was as much a tribute to the foreigner's desire to do business with Mr. Soong as a recognition of the need for tariff revision, represents the beginning of, and thus far the most notable achievement in, recent Chinese diplomacy. His agreements with various foreign firms have worked so smoothly that he has been able to increase taxes without a single protest, the foreign firms being quite prepared to meet the increases as long as the system was not burdensome.

In this article we are only concerned with the attitude of foreigners, but it is needless to say that the Chinese bankers would not have given him such whole-hearted support were it not for the faith they have in the man and his policy. The establishment of the Sinking Fund Board of Trustees has restored government credit in China and has taken domestic loans out of the realm of party politics. In the July issue of the *Far Eastern Review* we published the report of the Sinking Fund Board of Trustees which manages the amortization of domestic loans. This report is a monument to sound government finance in China and redounds equally to the credit of Mr. Soong and the bankers. The fact that the government bonds average 80, when not so long ago 50 was a fair price, is further evidence of confidence.



Mr. T. V. Soong, Minister of Finance

Mr. Soong's difficulties with his Government arose from four general conditions in the Chinese governmental situation:

1. The Extravagance of Militarism

Each Government in China since Yuan Shih-kai has suffered from the cost of maintaining the ever increasing army of China, which has perhaps reached 2,000,000 men and which cannot, so far as is evident at the moment, be utilized effectively in the defence of the country. General Chiang Kai-shek has, at various times, sought to achieve disbandment, but in each instance some political impediment arose, such as the campaign against the Kuangsi faction in Hankow and Canton or the Feng Yu-hsiang defection in the North, which required instant and costly mobilization of the Nationalist Army.

Any army, in mobilization or at war, is costly, but in China the lack of central financing, the lack of a budget and the inadequate control of fiscal agencies by the Minister of Finance leads to extravagance and waste. Furthermore, the vestiges of tuchunism, which continue particularly in North China, place heavy burdens on the national treasury and upon the people.

2. The Lack of a Budget System

During the Revolution a budget system was impossible. Between 80 and 90 per cent. of the net national revenue was expended for military purposes, and in the desperation of the moment many of these expenses, had to be of a secret character, as they were expended by the military authorities during civil war.

The absence of a budget system makes it impossible, not only for the people, but even for the Minister of

Finance, to know what the national commitments are likely to be over a given period. Various departments of the Government arrange for expenditures without any consideration for the responsibilities of the whole government. This is not a new phenomenon. The budget is a comparatively recent institution in government finance, the United States, for instance, having instituted it only a few years ago. But it is now quite clear to students of the science of government that no government can operate economically, or with due regard to the welfare of the tax-payer, unless a machinery has been constructed for the preparation and enforcement of a budget.

So far as China is concerned, a budget for national expenditures is absolutely essential because of the complex relationship of national and provincial finances. At the Economic Conference it was decided that there should be a budget and that the military expenses should be limited to Mex. $192,000,000 a year. This proposal has several times been accepted in principle, but has not been enforced.

Mr. Soong makes the enactment of the budget the keynote of his financial policy. He is prepared to risk his entire career upon it. He believes, as is evident from his letters herewith appended, that without a budget system it is impossible for him or for any man to continue to find finances indefinitely.

3. The Lack of A Coherent Loan Policy

Perhaps as a vestige of the old Manchu days, or even as a remains of tuchunism, the habit continues for different departments and various provinces to make financial arrangements, which serve to increase the national debt independently of the Ministry of Finance. It is within the writer's memory that the National Government passed a resolution requiring that all such engagements be submitted to the Ministry of Finance for approval, but it is evident, from the bare reading of the daily press, that independent commitments are being made.

It will be seen that in Mr. Soong's telegram to the National Government, in which he agrees to withdraw his resignation, he stresses this factor most emphatically. The reasons are apparent. National credit can only be restored if there is a definite, coherent loan policy, based upon a program of reconstruction and the increase of industrial productivity. In this connection, special attention is called to the speeches of Mr. Thomas Lamont and Mr. Chang at Amsterdam, which are published on page 341 in this issue.

4. The Control of Expenditures

Hitherto the Minister of Finance has limited its activities principally to the collection of funds. The disbursement, as there is no budget, is under the control of the various agencies concerned. The Ministry, then, is unable to work out a budget of expenditures, as it has no means of knowing, in advance, what the departments will spend. For instance, there is no control, outside the army, of the military expenditures. Much of the criticism of the Nanking Government and of individuals connected with it is due to this single fact. Mr. T. V. Soong, for instance, has been most unjustly maligned by opponents, some of whom have gone so far as to accuse China's best official of peculation. There would be no grounds for such accusations, there could be no misunderstandings of this nature, if the Ministry of Finance controlled the expenditure as well as the collection of funds. Surely, it is not just that such a man as T. V. Soong should bear the full burden of this inequable system unless he is given a control over the expenditure of national revenues such as any Minister of Finance in any modernly governed country enjoys.

The documents with regard to Mr. Soong's resignation follow:

Mr. Soong's Letter of Resignation

"At the present Conference called to effect the disbandment of troops, the discussion has dealt with huge sums of money for the actual cost of disbandment and for the military expenditures after disbandment shall have been accomplished. As it is my task to raise funds for these purposes, I have summoned a conference of financial experts who reached the unanimous conclusion that while the required sums can be raised, there must be an assurance of an adequate budget system which shall be fully effective hereafter.

"During recent years, the financial situation of the Government has been fraught with overwhelming difficulties, and the people have borne the heavy burdens only because of the hope that when the unification of the country shall have been accomplished, military expenditures would be greatly reduced and that a proper budget system would be enforced. There is even now no assurance that these primary principles will be made effective. If after the present disbandment there will still be no limits to military expenditures, if no budget system can be enforced, then the national credit will be ruined and the burdens of the people will become increasingly heavy, so that even if we exhaust all the financial resources of the country it will be impossible to raise more funds.

"At the Disbandment Conference last Spring it was decided that after disbandment, the military expenditures of the entire country should not exceed $16,000,000 monthly. For a newly-established Government such a military burden is heavy enough. But in observing the tendency of the present Conference it seems to me that even after disbandment the monthly military expenditures will undoubtedly be far in excess of the sum then set as a maximum. It is my considered opinion that the monthly military expenditure of the country should not exceed the amount originally decided upon. If this limit is not adhered to, then there is no hope of effecting a national budget, and if there is no budget, no orderly development of the nation is possible.

"At the Fifth Plenary Session of the Central Executive Committee, at the Third Party Congress and at the Disbandment Conference last Spring I submitted detailed figures of receipts and expenditures, indicating the dangers and showing clearly that without a workable budget system there was no hope for the future.

"While the country was still in a state of civil war there were justifications for not decreasing the military expenditures and for the failure to operate in accordance with a budget. Now, however, that unification has been achieved and internal dissensions have been brought to an end, if a reduction in military expenditures and an operative budget system are not enforced then it becomes impossible for me to face the sorely-tried people of our country.

"I have never been afraid to face difficulties. But there are limits to my energy and ability, and the reproaches of the entire people in the future will be without bounds. Rather than court a just censure to come, I choose to retire to-day. I, therefore, respectfully beg to submit my resignation.

"T. V. Soong."

Mr. Soong's Interview Regarding His Resignation

Questioned by the *Kuo Min*, correspondent about his resignation, Mr. T. V. Soong, Minister of Finance, replied that "the decisions of the Disbandment Enforcement Conference, to put it simply, require that within three months the army shall be reduced from 1,600,000 to 800,000 men.

"This is a colossal undertaking, the magnitude of which, I fear, few have yet realized; and it is obvious that the military leaders, however resolute, cannot achieve what amounts to a radical change in the political and economic status of the country unaided by the Party, the people and by the civilian officials.

"Nor will the task be anywhere nearer completion if the millions of disbandment expenses are neatly piled in the Central Bank vaults ready for immediate distribution.

"The only hope of success lies in stirring the interest and securing the support of the merchant class, the industrialists, the educational bodies and the other conscious elements of the people, as well as the rank and file of the Party—in other words, to involve the whole nation in the task of disbandment.

"And it is not enough that the people be merely called upon to foot the bill and shoulder the responsibility of raising money; organized public bodies should take a hand in supervising the disbandment expenditure within each military zone.

"Even with all this, we may fail to achieve the desired result within the short space of three months; but if there is any possibility of success it lies in the enthusiastic and aggressive participation of the people."

Mr. Soong's Telegram Withdrawing His Resignation

"To the National Government:

"I beg to acknowledge receipt of your telegram asking me to withdraw my resignation and stating that the reduction of military expenses and the inaguration of a budget system will be strictly carried out. I appreciate the confidence shown in me and have given careful consideration to your opinion. As it is my desire to serve the Party and country faithfully, I consulted with Chairman Chiang with regard to the allocation of disbandment expenses. He agreed that all disbandment expenditures should be carefully supervised by the Party, the Government and public bodies; and that a special commission should be appointed for that purpose, so that no money can be drawn upon, for each disbandment area, except with the approval of these bodies.

"As far as the budget is concerned, the Minister of Finance has hitherto only undertaken the responsibility of collection, but it is impossible to operate a Budget System unless he participates in the control of expenditures of whatever nature.

"With regard to the cost of disbandment and funds necessary to cover current military expenses, the total sum required is enormous and cannot be raised by the sole efforts of one individual. Successfully to accomplish our purposes, besides the full active support of the Party

"(1) the assistance of the merchants, bankers and industrialists and the people in general is essential;

"(2) every Department of the Government must co-operate fully with the Ministry of Finance, especially during this critical period;

"(3) all Provincial Governments should exert all their energies to the single end of assisting the Ministry of Finance in accomplishing a unified financial system, which must have as its foundation a national budget.

"This budget must include not only current expenses, but also national obligations. The Ministry of Finance must participate in all negotiations and in the conclusion of any agreements for foreign and domestic loans, so that the national credit may not be imperilled by the pursuit of different and confusing policies by various departments of the Government.

"It is my conviction that only with the budget system and its associate principles as outlined can a successful administration of national finance be continued.

"Fully relying on the unstinting support of the Party and Government, I am returning to Nanking on Wednesday to resume my work with the high hope that your support will compel success."

American Investments in the Far East

Over $1,600,000,000 of American Capital now Invested in Far Eastern Governmental Securities and Private Business Enterprises. Japan and China Offers Field for Illimitable Future Investments

By George Bronson Rea

A RECENT report by Herbert M. Bratter of the Finance and Investment Division of the Department of Commerce, on the public finances of Far Eastern countries (including Australasia), shows that American capital to the extent of approximately a billion dollars has been invested in Far Eastern securities since 1914. Although the details of these investments are not disclosed in the body of the report, the foreword by O. P. Hopkins, says:

"American investments in Far Eastern countries have steadily mounted in recent years. Estimates of the Bureau of Foreign and Domestic Commerce covering issues publicly offered in the United States from 1914 to 1928, inclusive, total $851,258,680 for Far Eastern countries other than United States possessions. Of that amount, roughly three-fourths, or, $640,397,000, was invested in governmental, provincial and municipal issues. Included in that figure are the large post-earthquake loans to Japan and the extensive borrowings of the Australian Commonwealth and States. The Australian borrowings, which commenced in October, 1921, totaled $246,688,000 at the close of 1928.

"When, to the above estimates are added our investments in Philippine Government securities, placed at $148,632,000, the total is just under $1,000,000,000, without making allowance for such investments prior to 1914, nor for investments in other than governmental securities. There are, in addition, American business and philanthropic investments; these the Department of State estimate at $147,461,909 in China alone.

To the above, the $50,000,000 investment by the American & Foreign Power Company, in the Shanghai Municipal Electricity Plant must be added to the China estimates, increasing this to $197,461,409 thus raising the total to nearly $1,200,000,000. Mr. Robert W. Dunn, in "American Foreign Investments," published in 1926, estimates the total of American capital invested in 101 Philippine, commerce, industry and manufacturing enterprises at $276,511,000. American rubber investments in the Dutch East Indies and the Malay Peninsula approximate $15,000,000.

The exact extent of American participation in Japanese industrial enterprise is not known. The General Electric Company has combined its Japanese business with the Shibaura Engineering Works and the Westinghouse Electric Company with the Mitsubishi interests to form a manufacturing company. The Western Electric Company is also identified with the Nippon Electric and the Tokyo Electric Company. The Oriental Consolidated Mining Company owns ten gold mines in Korea. The Ford Motor Company and the Truscon Steel have formed Japanese companies and erected plants near Yokohama. The General Motors, it is understood, is to erect an assembly plant at Kobe. American capital is also interested in flour, glass and steamship enterprises.

Roughly estimating American investments in Japanese industrial companies at $50,000,000 we have a total of nearly $1,600,000,000 of American money actually invested in the Far East and Australasia. This excludes private investments in Siam, Dutch East Indies, Malaya, and Australasia.

The present rate of American absorption of European securities cannot go on. Most of the European countries have completed their fiscal and currency reforms and are well along the road towards commercial and industrial prosperity. These countries will cease to borrow except for refunding purposes and will again become a factor in the field of international investments. That this stage has already arrived was disclosed by Sir Kengo Mori (Japan's chief delegate to the German Reparations Conference) in a talk he gave to the New York Bond Club on June 18 ulto.

> Pointing out that the reparations committee provided for a maximum amount of the basis on which reparations bonds could be issued, Sir Kengo stated that the amount actually to be issued at a time will be limited naturally by the conditions of the world markets at time of issue.
>
> "As I see it," he said, "the conditions in some money centers of Europe, particularly in France, are such as enable them to absorb the greater part of the coming issue, if any. I apologize if my statement of this was disagreeable to you. But I earnestly hope that if the amount of participation in the issue of reparations bonds offered to the American market in the future falls below your expectations, and perhaps even your desires, you will not be greatly disappointed. We are all aware of the money conditions now prevailing in this market, and so it is fortunate perhaps that other markets will be in shape to absorb, as have said, the bulk of any future offerings."

The most significant part of Sir Kengo's talk was when he discussed Japan's financing in the United States, predicting an extension of American interest from the position of a mere lender to that of a participant in Japanese industrial equities.

> "The international finance of Japan," he said, "is undergoing the progressive stages of natural development. In the first stage she began by testing her credit in foreign markets in the form of Government bonds, to be soon followed by the issue of Government guaranteed bonds and municipal borrowings. In the second stage, private enterprises have come sufficiently recognized to issue their bonds on their own merit and strength without any help from the Government. This is a remarkable progress achieved within the short space of the last five years. But I shall not be surprised if this progress will not be followed by one step further and will not land Japan at what I may call the third stage in which the American investment public, instead of simply continuing to be lenders to Japan as hitherto, will be willing to become partners of the enterprises themselves in that country. Then the international finance between America and Japan will have attained the most satisfactory state in which the interests of these two peoples will be interlocked and that will go a long way to help cementing the existing friendly relationship still closer.

Japan bases her hope of attracting American capital to co-operate as a partner in the expansion of her industries, on her "will to pay" and to share proportionately the profits from such a partnership. The will to pay, is the real source of an even flow of payments, without which any agreement would not be worth the paper it is written upon. The civilized world to-day, is run on the basis of a belief in promises—promises to repay with interest what we borrow. The nation which defaults or is unwilling to concede equitable rewards from foreign capital invested in its industrial enterprises, will find it difficult to convince American investors of their good-faith. As long as the policy of the American Government towards foreign loans remains as it is to-day Americans will continue to invest their money abroad on a belief in the ability and good-faith of the borrowers to protect the principal and remit the interest or their legitimate share of the earnings.

American bankers and investors are now looking towards China as a profitable field for future investment and just as soon as the Nationalist Government has unified its control over the whole country and its revenues, devises a program that will take care of its outstanding indebtedness,—and evinces a willingness to permit foreign capital to participate equitably in her commercial and industrial enterprises, confidence in her credit will be restored. A strong, stable government in China, competent to discharge its international obligations and guarantee protection to lives and properties and some measure of justice in its courts, will, in the next few years, attract a steady flow of American capital into the country for productive enterprises.

It is well to recall that President Hoover, as Secretary of Commerce, laid down the principle that "no nation should itself, or should allow its citizens, to loan money to foreign countries, unless this money was to be devoted to productive enterprises. That is, if nations would do away with the lending of money for the balancing of budgets, for purposes of military equipment or war purposes, or even for that type of public works which does not bring some direct or indirect productive return, a great number of blessings would follow to the entire world."

There has been so much talk and publicity about the enormous loans that are to be sought by China for various rehabilitation, currency reform and other unproductive purposes, that the recent statement by Minister T. V. Soong, to the effect that he does not contemplate any such financing, has had a most beneficial effect upon opinion in the United States. When conditions in China are considered stable American capital will be interested solely in productive enterprises and with President Hoover's well known attitude on these matters, it is hopeless to expect that the American Government will approve of any loan to Chinese national, provincial or municipal governments that contravenes this principle.

China and the American Banking Group at Amsterdam

By George E. Sokolsky

MR. T. V. SOONG'S recent suggestion to the National Government that commitments with regard to foreign and domestic loans should be under the control of the Ministry of Finance comes at a most fortunate moment, for China's loan position has again attracted international attention because of the discussion which took place on this subject at the International Chamber of Commerce meeting at Amsterdam. The Chairman of the American delegation at this meeting was Mr. Thomas W. Lamont, Chairman of the American Banking Group, of the International Consortium and partner of J. P. Morgan & Co. The Chairman of the Chinese delegation was Mr. Chang Kia-ngau, Managing Director and General Manager of the Bank of China, and one of China's leading bankers, whose affiliations with the Central Bank of China and the Ministry of Finance are close and cordial.

Two facts became immediately evident: one is that the Consortium is still in existence and that the American Banking Group still controls the American policy with regard to loans to China. The second is that Mr. Soong is not grovelling at the feet of international bankers for loans which cannot be made with dignity and profit. Mr. Lamont and Mr. Soong are apparently in agreement that the foreign indebtedness of China cannot be increased, except for productive purposes. Mr. Lamont emphasizes the importance of China's meeting all outstanding obligations before it is possible to incur new ones.

For some time, there has been an apparent misunderstanding in China that the United States would lend money to China for political reasons, for good-will, to foster the purchase of American goods and as a general sympathetic gesture. It has been assumed by wholly misinformed persons that the presence of various financial and engineering experts in China was a preface to huge loan operations. Such theories precluded a knowledge of the essential American loan policy *that loans should be made only for productive and constructive purposes such as railways, public works, harbors, etc. Purely administrative enterprises, such as disbandment of armies, construction of cities, highways, and other non-profit earning enterprises, do not appeal to the American purchaser of bonds and will not develop interest in large loans from the United States.* Although some banks and industrial houses may make small loans to assure themselves of the business involved in the transactions, enormous loans, such as China requires, for reconstructive purposes must appeal to the general purchaser of bonds, must have the approval of the American Banking Group and the imprimatur of the Department of State.

These facts are so self-evident from all the statements and speeches which have been made, that it is difficult to understand how any intelligent persons could misunderstand the American attitude. To the American bankers, a loan to China is a strictly business proposition. It must pre-suppose that China's credit is sound and that the money lent will be used only for such purposes as represent a tangible and indestructible investment.

China's credit cannot be regarded as sound until all obligations, including merchants' accounts, are dealt with in a manner as satisfactory to the creditor as to the debtor. China has never renounced a single indebtedness, not even political loans which were often denounced by the Nationalists before they achieved power and which are admittedly of uncertain validity; yet certain obligations, including merchants' credits, remain in default, and as long as they remain so, China's credit in the international money market must remain unsatisfactory.

Mr. T. V. Soong, with his usually realistic analysis of the situation, sensed the fact that this was not the time to discuss new foreign loans and that independent meddling with the problem only served to confuse China's friends and might spoil any possible market in the immediate future. In an interview with the Shanghai correspondent of the New York "*Times*" on June 29, he said:

> "So far as foreign loans are concerned, no plan to enter foreign markets is entertained at present. We may say that such rumors at present are entirely false. We are interested in foreign capital coming to China, but we shall not particularly seek to interest foreign capitalists until we have something more definite to offer."
>
> Although reticent, Minister Soong was frankly optimistic as to China's ability to reorganize her revenues within a few years, and then he thought the government would consider projects for seeking large scale foreign loans. Despite his stand, however, rumors persist that various Nanking Ministries propose to encourage, if not to solicit, foreign loans for various projects within the coming year, if not this Fall.

Mr. Soong's statement is a concise reply to those who are attempting to give the impression that China is begging for a loan. As a matter of fact, current requirements have been and can be met by domestic loans through the medium of Chinese banks, the Chinese public buying these bonds, which have recently proved a popular form of investment.

American adventurers and irresponsible gold-diggers and sentimentalists have misled certain Chinese into assuming, that if China merely gave the appearance of unification, hundreds of millions would pour into this country across the Pacific. That is not a business point of view. Sound banking requires not the appearance of anything but unmistakably sound security which will appeal to the purchaser of bonds offered to intelligent people on the open market.

There has been much tosh spoken in China about the International Consortium and the American Banking Group. The smaller and less responsible bankers have encouraged an assumption that the Consortium is not quiescent but dead and that the American Banking Group will scatter like a sandpile once an independent breaks through the barriers and effects a loan. Nothing can be more dangerous to sound financing in China than this assumption, for not only is it altogether false but it presupposes an entire change in the policy of the United States Government towards foreign loans. The Consortium and the American Banking Group came into existence at the invitation of the State Department. Its policy has been entirely guided by the State Department. Its unwillingness to do business with China over a period of ten years has been initiated and approved by the State Department. Is it possible to believe that the American Government, that President Hoover and Secretary of State Stimson, will approve of any China business going to a house which has not co-operated with a body which, in every respect, represents the whole of American policy on the subject? Such an assumption utterly disregards the actual state of affairs in Washington and Wall Street.

Mr. Lamont's Speech

Mr. Lamont's speech, which is here reproduced in full, must then be regarded, as an expression of official American policy. Mr. Lamont said:

It is a great satisfaction to me to join my associates of the Chamber in welcoming here these distinguished representatives of the commercial and business life of China. We appreciate the trouble that they have taken to come half way around the world to join us in our deliberations. We need their own interpretation of those conditions as related to the great movements of commerce throughout the world. We are most anxious to have the concrete ideas of these gentlemen as to how we can work effectively with them. The warm interest which I have in Chinese affairs dates from a visit which I made to China in 1920. At that time I was deeply impressed with the capacity and sound qualities of the Chinese mind. My interest, first aroused at that time, has constantly increased, and no one has viewed with greater satisfaction than I, the recent progress in China towards permanent and stable government.

The Chinese Delegates who are with us to-day realize, as do we all, that the International Chamber is essentially an institution of co-operation. It was founded soon after the close of the Great War, distinctly with the idea of furnishing to leading men of affairs throughout the entire world a better medium for contact and interchange of views than had ever existed before. Thus it was felt that not only would the business of the world be carried on with better understanding and effectiveness, but that the International Chamber itself would constitute a real factor in the safeguarding of world peace. Co-operation, as I say, is the keynote of the Chamber. And someone speaking of international affairs said recently. "Co-operation was at first a discovery; it has now become a habit." We trust that our Chinese friends to-day will have already become addicted to this same habit which marks every activity of the International Chamber.

How then can the Chamber give concrete evidence of its desire to co-operate with the Chinese? At the very outset, we start by expressing the great sympathy which we have for the aims and aspirations of the Government in China; our confidence in the ultimate achievement of those aims; our respectful desire to assist in whatever way we can. In order, however, to make some sort of start must we not endeavor to find some common meeting ground of ideas? Would it be useful for us to explore with these Chinese delegates and ascertain upon what points we find ourselves in ready accord, and then from such a basis proceed to gain further views and workable knowledge?

Is it not then true, as our first and simplest proposition, that looking at China as a whole we agree—we Americans, the Europeans, even the Chinese themselves, that in the Chinese people we have a race extraordinarily hardy, industrious, frugal, peace-loving and intelligent? Do we not agree that in China there is vast territory of fertile and arable land with perhaps, seventy-five per cent. of it still untilled? There at the very start we see a great resource in agriculture that is as yet far from development. We realize that as yet the chief occupation of the Chinese people is agriculture, but that their equipment for cultivation is simple,

Mr. Thomas W. Lamont

Mr. Chang Kia-ngau

and the results obtained are not in proportion to the efforts exerted. As to China's mineral resources : while they may not be of extraordinary richness, nevertheless they are abundant, and under proper development adequate for a great part of China's needs. In the matter of means of transportation, perhaps the country's inadequacy is most marked. If China is to become really unified, a strong and powerful nation growing out of the splendid race that is there to-day, must there not be some great development in the building of ordinary highways and, of course, eventually of railways ?

What, as to Government ? And in making this inquiry I am not venturing to touch upon the domain of politics, but ask the question simply as it relates to China's commerce, especially her international trade which naturally comes within the purview of the International Chamber. Too many of us are disposed to regard China from an occidental viewpoint. Even we in America and in Europe have a realization of the difficulties of popular government at home. How much less must we demand and expect immediate results from our friends in China who are engaged in the stupendous task of changing a monarchy, in existence for thousands of years, to a republic constructed on Western lines ! And yet after seventeen years of unsettled government following the fall of the Manchu régime, stable government seems to have been established. Obviously this new government is faced with the almost bewildering task of setting up and putting into operation its various functions. Even with the great progress already made in the last year and with the promising prospects which are ahead, our Chinese friends tell me they are under no illusion as to the severe task that is before them. A part of their strength to-day rests in the knowledge of what they have to face ; in the recognition that steady patience and the cultivation of public spirit must ever be on their minds ; that the idealistic leadership which has brought them thus far must be seasoned into a leadership of prudence and wisdom. The very magnitude of the task, the nature of the problems in political science which China must solve, are a challenge to these leaders some of whom are with us to-day.

In this connection, it must be a great satisfaction to us all to find that the new Government is seeking expert counsel for the study of its fiscal, its financial, its tariff, both import and internal,—and its taxation policies. Are we not all agreed that effective co-operation with China from men of affairs the world over ; that internal development in China, in so far as she may desire or require assistance of foreign capital ; that the expansion of China's foreign trade both import and export—depend in large measure upon the manner in which the new Government in China goes to work to solve these problems in national and international policy ? The members of the International Chamber cannot themselves—with certain notable and distinguished exceptions—lay pretence to being experts in the science of government. But they are well aware that the development of industry and trade within and beyond their own countries has been in large degree dependent upon the development of sound governmental policies, the establishment of balanced budgets and equitable schemes of fiscal reform and taxation.

As to Governmental loans, it gives us great satisfaction to hear our Chinese friends here declare themselves so clearly against any policy of governmental borrowing for non-constructive purposes. To burden any people with loans negotiated for the purposes of meeting a recurring budget deficit is indeed unsound and leads only to difficulty. To borrow at sometime in the future, when conditions warrant it, for sound purposes of development,—for the building of railways, for instance—or for the carrying out of other construction governmental measures, is a different matter. China's own banking and investment resources are increasing, and as time goes on China herself may be able, I hope, to finance largely her own enterprises of public utility. There are, however, certain Chinese individuals from whom I have heard, persons who are perhaps not as sound and conservative as our friends here ; and such individuals seem to think that with civil war largely ended and with new government established, China would, even now, have no difficulty in obtaining from the American market such loans as she might require. *On this point we must be realists, and the greatest lack of friendship that we could show to-day would be simply to speak pleasant words to the Chinese, to give them general assurance and yet to fail to make concrete mention of certain steps that are requisite in the situation. It is on this point that frequent inquiry has been made of me. And I am bound to reply that at the present moment all who are China's friends must realize that China's international credit is at low ebb and until careful measures for its re-establishment have been undertaken by the Chinese Government, no loans on any scale calculated to be helpful could be made in the markets of New York, and I will venture to add in those of Europe. A great part of the specific security set aside for such foreign indebtedness and for the service of such foreign loans has been sequestered, and is no longer being made available for the service of the loans. Until these conditions are remedied, there can be no question of further credits on a material scale for any purposes.*

In describing this situation, not for a moment am I suggesting criticism upon any individual or group of individuals in China. On the contrary, we are well aware of the state of civil warfare which carried on for years past has served to bring about this unfortunate state of affairs. My only point is that now the long, slow, patient work of rebuilding and restoration of credit must be undertaken. Towards co-operation in that work, we in the Chamber stand ready to pledge ourselves.

Another point I venture to make is that, in this process of credit restoration, due regard must be had for all foreign loans to China issued for value. In saying this I have, of course, in mind no special loans of any kind ; I only know that holders of these loans, be they British, French, American or any other nationality, must receive equally fair treatment. Each loan must in the scheme of things be treated upon its merits and not upon the ground of future credit favors to be received. In these modern days of increasing international understanding and cooperation no policy of discrimination in favor of the holders of Chinese obligations in any one country as against the holders in any other country can make progress.

It is only by looking problems in the face that we can really grapple with and undertake to solve them. I feel sure that our Chinese friends have thorough understanding of our attitude on all these points. I am confident it is an attitude shared by our colleagues here to-day from every country, including those from China itself. I look to see the new régime in China which has been described as idealistic, turn out to be as realistic as it is idealistic. Only in that way—and I am confident that it is a way which by careful, patient process will surely be found—can the great Chinese people assume the place which rightfully belongs to them in the great movements of international commerce.

I ask you to let me close as I began, with the assurance once more of our genuine friendship for China and of our confidence in China's future. I wish that I had the ability to convey with this assurance some expression of the new spirit, the new ideals that I venture to think animate and guide international business ; something of the spirit of tolerance ; something of the ideals that govern the men that compose this Conference. For them and for us all I bespeak in our relationships towards China, in our relationships among each other, the excercise of infinite tolerance and patience. I am fond of recalling Milton's Ode to Cromwell that : " Peace hath her victories no less renowned than war," but I ask you to remember with the British essayist, Green, that the victories of peace " are to be won not in days but in centuries, and by the energy not of feeling but of thought."

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At this juncture, it is important to note the rôle that Mr. Chang Kia-ngau played at the Amsterdam meeting. He undoubtedly realized that China's dignity had to be upheld at any cost, that the constant loan propaganda emanating from ill-advised or irresponsible sources in China was damaging the prestige of his country. He indubitably knew the policy of Mr. T. V. Soong with regard to foreign loans, which he fully approved and supported. It was, therefore, an exceptional opportunity to make an official pronouncement of Mr. Soong's policy in the presence of the leading business men and bankers of the world, so that China's credit might be improved. He risked censure from misunderstanding enthusiasts at home, but that is a matter of no account if he accomplished the restoration of confidence in China's financiers and financial policy in the international money market.

In his speeches Mr. Chang made his views perfectly clear. " Reckless borrowing without due planning.......................would always be detrimental to the national credit."

Mr. Chang's speech of July 7, is here given in full :

Mr. President and Gentlemen.—On behalf of the Chinese National Association of the Chambers of Commerce. I wish to express our deep appreciation for the cordial invitation extended to us by the International Chamber of Commerce to participate in the Amsterdam Congress. I also wish to take this opportunity to explain to you briefly the general outlook and aspirations of the Chinese Government, of the Chinese merchants and of our people in general towards the economic relations with foreign countries and towards business and industrial enterprises at home. It is my fervent hope that these few remarks of mine may help you to understand China better and may eventually lead to closer cooperation between my country and those other nations which you so ably represent.

Since the revolution of 1911, China has gone through a period of political unrest and disturbance. For a time, some of our people as well as some friends of China entertained the hope that the possible awakening of the conscience of the militarists would bring about an early restoration of peace and order. In this we were greatly disappointed. We realized that no fundamental solution of China's problems could be made unless we ourselves would participate in the revolution. Inspired by this realization, we have spared no efforts and made every possible sacrifice to make the revolution a success.

Prior to the establishment of the National Government, China's international economic relations were characterized by foreign loans. In name, the purpose of these loans was either for financial readjustment or for industrial development; but in fact they were solely for meeting the deficits of the government. No consideration was given to the adjustment between national revenue and expenditure and to the development of national resources. Once the loans had been contracted, the control over financial sources serving as securities would be left to the creditors, and there the matter remained. When the financial conditions became more chaotic, the government had to borrow again in order to meet the situation. Unless arrangement could be made in due time, delay and default were inevitable ; and even the status of the securities handed over to the creditors would be seriously affected.

As to private enterprises, some Chinese were engaged in foreign trade or industrial undertakings purely for personal gains. They were concerned about immediate and large profits rather than about the ultimate development of these enterprises. They paid no heed to either national welfare or to the changes of the economic conditions in the world. Consequently they were often unable to cope with unfavorable conditions arising in home markets or abroad, and many ended in sad failures.

However since the Nationalist Revolution, the economic thought of the Chinese people and of the Government has fundamentally changed. *Financially the National Government is now keenly aware of the fact that reckless borrowing without due planning and consideration of the revenue available as security would always be detrimental to the national credit. For this reason the National Government of China has refrained and will* *continue to refrain from making new foreign loans for administrative purposes until they have found ways and means of repayment. As to the old legitimate unsecured loans contracted by former governments, the National Government is willing to re-adjust them out of the balance of the national budget as soon as conditions warrant. You may be interested to know that a special commission has already been appointed to study this problem as a preliminary step towards their final readjustment. In this connection it may be stated here that the new domestic bonds issued by the National Government are well secured and all enjoy public confidence.*

Industrially, whatever little activities there might have been in the past, they were prompted mostly by sporadic impulse and directed by individual efforts without any systematic planning. But now, technical experts have been engaged to make a thorough study of this vital problem. A detailed plan will be drawn up beforehand for a series of years with a view to developing China industrially and systematically. Unless ample means can be provided in advance for repayments, neither Chinese nor foreign capitalists will be approached to invest their money in China for any industrial enterprise. China has just entered upon an era of reconstruction. There will be a time in the near future when she will be in great need of material assistance as well as assistance in knowledge and skill from foreign nations. In seeking such assistance from foreign nations, she reserves the right of freedom of choice and is opposed to any scheme of international combination towards China, however well intentioned it may be.

On the part of the people, many have also come to realize that while commerce and industries may benefit private individuals, the enterpreneurs owe it to their country as well as to the world that their activities should be guided by the spirit of sacrifice and co-operation. They are now ready to assist the Government in working out a practical scheme for industrial development on a national scale and comparatively sounder basis than hitherto. Furthermore, they are prepared to promote international trade on a reciprocal basis and for the mutual benefit of all parties concerned. *Summing up, hereafter the economic policy of the Chinese Government will be based on sound business principles rather than on reckless borrowing*; and the fundamental outlook of the Chinese people will be changed from one of individual efforts to that of national planning and of international co-operation.

Speaking of the aspirations of the Chinese people, it is a well recognized fact that in the course of evolution and revolution there arises invariably a conflict of interests. Auto-suggestion from within and moral encouragement from without bear a great moulding influence upon national evolution. Perhaps during the last few years, foreign interests in China may have suffered a set-back either directly or indirectly. Nevertheless we feel convinced that the countries which you represent all cherish good-will towards China. The evolutionary changes in China must have aroused your sympathy. *For instance, hitherto foreign creditors solely relied upon absolute control over the securities for the protection of their interests. But hereafter they will perhaps place greater consideration than ever before to the national credit of China as a whole, rather than the mere control over any particular financial source serving as security.*

As to trade, it is earnestly hoped that the friendly nations will soon voluntarily give up the remaining special privileges and restraints such as unilateral treaties, thereby giving China a free hand in adjusting her own economic problems. In the purchase of materials or merchandise from foreign countries, besides taking into consideration the elements of quality and price, our people will also be influenced by the psychological factor, that is, the attitude between nations. All things being equal, those nations which treat China in a spirit of equality will gain more friendship from our people, and as a consequence, obtain more satisfactory results in their trade relations with China. On my part, as chairman of the Chinese delegation, I can assure you that the Chinese people are always willing to co-operate with you in making China a world's market for trading on equal footing and on a basis of reciprocity.

Mr. Chang's speech must be accepted as representing the fiscal policy of the Minister of Finance, Mr. T. V. Soong, as well as the responsible financial leaders of China.

Port Development of Nanking

IN order that a great world port may be successfully developed in a given locality, there are certain elements which must either exist or be possible of economic achievement.

First of all, channel depths must be possible for vessels of ocean-going draft. Railroad facilities are essential for the linking up of the ocean carrier with distant inland points. Highways are needed for the fast economical transfer of freight between the port and nearby territory. River transport for the transshipment of ocean-borne cargo to distant places beyond the reach of the sea-going vessels does much to aid in port development. The population not only of the port itself, but also of the hinterland to be served, must be carefully studied and its probable growth estimated. The natural resources of the entire territory to be served must be given due consideration with a view of encouraging and promoting industries in every locality where they may become shippers of raw materials and locally manufactured articles through the port ; and where they will become consumers of the products of their own and other countries that can best reach them by means of ocean and coastwise shipping. Upon this population and these natural resources depends, in a large measure, the amount of goods that can be offered for shipment and the amount of incoming tonnage that may be absorbed or distributed through the port.

On this tonnage depends the required berthing space for ships and the number of square meters of floor space required for transit sheds and godowns. The design of handling and storage facilities for manufactured goods, goods in process, grain, coal, oil, lumber, ore, etc., can only be determined by study of the probable quantities of each class. It is obvious that the law of supply and demand will determine all such questions from the point of view of population, industry and natural resources of both port and hinterland. A brief study of the existing situation shows Nanking to be remarkably well placed for development as a great world port.

Nanking is situated on the south bank of the Yangtze river 220 miles above its junction with the Whangpoo. It is already provided with a channel depth sufficient at high water to pass the largest ships now entering the port of Shanghai. As the amount of shipping increases to a point where it is sound economics to do so, this channel can be easily dredged across the Lang Shan flats, its only shoal spot, to permit the passage of ocean-going craft at all stages of tide. In addition to dredging, some little work in training walls will be needed, but the location is such that these may be constructed at a reasonable cost. The port of Shanghai lies 14 miles from the Yangtze, on the Whangpoo, and Nanking, therefore, is only 206 miles further for sea-going ships. Once over the Lang Shan flats there is a channel depth far in excess of the needs of the world's largest ships, and at Nanking itself there is a depth which varies between 50-160 feet within the limits of the upper and lower anchorage. The river is well over a mile wide at both anchorage limits, and at the narrowest point (3,500-ft.) the current speed seldom exceeds five knots even during highest high water. There is thus provided ample space for the safe manœuvering of very large vessels. The great depth of water has the additional advantage of insuring unusually smooth water in heavy winds.

The Yangtze is one of the longest navigable rivers in the world. River steamers ply its waters and tributaries for a distance of more than a thousand miles above Nanking. It is a splendid waterway for the cheap movement of the products of a vast hinterland. Manufactered articles, coal, ore, cotton, silk and farm products will find their way down this great artery by Chinese boats and through the port of Nanking to all parts of the world. On the return trip these Chinese river steamers will carry the manufactured articles and raw materials necessary to the industrial development of this great hinterland. Structural steel, railroad tracks and locomotives, lumber, oil, and machinery will become available from foreign countries ; coal, ore, grain, sugar, etc. from other parts of China may more easily and cheaply reach those parts of the hinterland where such commodities are, to-day, difficult to obtain. At the present time greater Nanking is the terminus of two great trunk line railroads—the Tientsin-Pukow, with its terminal on the north bank of the Yangtze at Pukow, and the Shanghai-Nanking line, terminating in Hsia-Kwan on the south bank. The completion of the projected line to Canton and the south will make Nanking the most important railroad center in China. These three railroads will link the capital with a very large area not reached by river transport, and the operation of through trains between Peping, Shanghai and Canton will be accomplished at a minimum cost by means of car floats across the Yangtze. Projected highways radiating from Nanking will make the port facilities available to large areas by means of motor transport. These three systems of transportation will bring the products of industry and agriculture of one hundred million people into the port from the enormous hinterland that they will tap. Through the port vast foreign markets will become available for the economic and industrial development of a very large section of China. These same railroads, river boats and highways will also take from the port those products of foreign countries and other sections of China that may be needed to supplement the natural resources and industry of the section served. There is ample precedent for the operation of a great river port at a distance from the sea. New Orleans, the second port in the United States, is situated on the Mississippi river 107 miles above the Gulf of Mexico. Houston, Texas, has been made a port of great importance by means of a ship canal, and the San Jacinto River, at a distance of 50 miles from the sea, with the important port of Galveston in competition at the Gulf entrance to the canal. At the present time a large seaport is being constructed at Albany, N.Y., a distance of 150 miles up the Hudson river from New York City. All vessels entering or leaving Albany will be obliged to pass through the port of New York, but the Government believes that an initial investment of $20,000,000 gold is warranted for constructing docks and transit sheds. The port of Montreal on the St. Lawrence river in Canada is one of the largest and most important in the world and is 1,002 miles from the straits of Belle Isle.

Other important examples of inland ports are :

Philadelphia, Pennsylvania	63	miles	from		Delaware Bay
Baltimore, Maryland	180	,,	,,	the	Atlantic
Portland, Oregon	112	,,	,,	,,	Pacific
Manchester, England	45	,,	,,	,,	Irish Sea
Bremen, Germany	54	,,	,,	,,	North Sea
Hamburg, Germany	67	,,	,,	,,	,,
Antwerp, Belgium	50	,,	,,	,,	,,
London, England	67	,,	,,	,,	,,
Nantes, France	78	,,	,,	,,	Atlantic
Bordeaux, France	60	,,	,,	,,	Bay of Biscay

There are three principal types of quay in general use all over the world. The selection of type is usually governed by local conditions. In the United States it is very general practice to develop the pier type in cases where sufficient space is available for the manœuvering and docking of ships. The ports of Portland in Maine, Boston, New York, Philadelphia, Baltimore, Jacksonville, Los Angeles, San Francisco, Panama Canal, Halifax and many others use the pier type. Montreal, Norfolk and some of the other large American ports use a combination of pier and bulkhead or bund types. New Orleans and Houston are exclusively of the bulkhead or bund type, on account of congestion that makes other types impractical. The majority of the European ports are of the basin type. This is made necessary by the great tidal variations which require a port arrangement where water may be maintained at a permanent level.

In arriving at a conclusion as to the best site in Nanking for port development all these things have been considered. A port, to be successfully and economically operated, must be laid out in conformity with the whole city or regional plan. The relation of the port to other centers of activity is most important. The government center, municipal center, railroad center, business center, aviation and industrial centers and residential sections and the port have each their particular locations in the general scheme of city planning. In selecting the best possible location for the port itself, four different points have been given special consideration. First, proximity to other transportation agencies. A port must have easy and economic connection with the railroads which are to feed it and take away its incoming freight. Railroad yards must be built in the immediate vicinity, and from a construction point of view must be near to the main line tracks in order to cut down construction cost. These yards require a large amount of space so arranged as to provide the cheapest possible switching facilities and the most economical use of locomotives and rolling stock. Second, convenience of transfer of commodities between the docks, piers or quays and the industrial section of the city. This must provide for railroad transfer of carload lots and obviously requires rail connections. Junk transfer from ship side to the industrial center must be considered, and transfer from the port itself by motor transport must be possible without undue congestion on the main arteries of traffic. Third, residential requirements for the large number of employees that will be needed for efficient port operation must be taken into consideration and sufficient space set aside in the near vicinity for the purpose. Fourth, how much berthing space will be required for the docking of vessels, for transit sheds and godowns, for terminal warehouses, grain elevators, cold storage, open storage classification yards, car floats, river steamers and junks. All four of these considerations point conclusively to a main port location in Hsia Kwan with auxiliary port development for certain classes of freight on the Pukow side. The Hsia Kwan site is ideally situated between the proposed industrial center and the location selected for the railroad freight terminal and classification yards. It provides ideal connections for through train service, both passenger and freight, from Shanghai and Canton to Peping and Tientsin by means of car floats. This system of car float transfer over inland waterways is very generally in use in the United States. It obviates the necessity of expensive bridge construction and has been used very economically for many years. As an example, all trains west bound from New Orleans cross the Mississippi River by this means. All freight trains entering the port of New York from the west are handled in a similar manner, and until recent years all passenger and freight trains between Washington, D.C., and Boston were carried a distance of 26 miles around New York harbor.

The ship space required at piers based on 100 tons per lineal foot of pier would indicate for a population of 2,000,000 in Nanking, together with nearly a hundred million in the hinterland, that 50,000 lineal feet of wharfage would eventually be needed. Hsia Kwan from the present terminal yards of the Shanghai-Nanking railroad to the San Cha River, at its southern extremity, would provide 37,000 lineal feet by use of the pier type of wharf. The present junk canal between Hsia Kwan and the city wall would be filled in and used for railroad facilities connecting the piers, transit sheds, etc. with the freight station and classification yards. The land west of this junk canal would be filled by dredging slips and pumping the excavated material on to the low-lying ground to provide usable land in place of the present water holes. The section between the Chung Shan malu and the present terminal of the Shanghai-Nanking railway would be developed into the best commercial district of Hsia Kwan. Residential land for port workers in the southern part of Hsia Kwan would also become available. The immediate development should commence at the southern boundary of the International Export Company (Ho-gee), and should extend south to the entrance of the existing junk canal (Huiminho). It would provide slips of sufficient capacity to take care of shipping for the next 15 years. In this way ample time would be left for the expansion and development of Hsia Kwan. Those buildings in Hsia Kwan that will have to give way to the immediate port development can be compensated for by an exchange for an equal amount of the new filled land on new streets to be laid out in the area. This will give better business locations to those shops which must move and should prove a great benefit to all property owners.

Transit shed facilities or godowns have been estimated on a basis of ship tonnage to be expected and provided for as above. On the basis of 40 c. ft. of space per ton of cargo piled six feet high, with ample allowance for aisles for circulation of vehicles, the area available on the piers is sufficient for all needs. In the interest of economy, it is proposed that the godowns be one storey in height. Experience at various ports in the United States, where both one-storey and two-storey godowns are used, has been that the former is not only much cheaper to construct, but is also very much less expensive to operate. The port as planned provides that the present passenger station in Hsia Kwan shall become the consolidated freight terminal in Nanking for all entering railroads—this change to take place at such time as the new Union passenger station may be ready for operation. Freight car team tracks are proposed in connection with this freight terminal station. Classification yards for the make-up of freight trains are provided with special reference to economical transfer from ship to rail. Ample freight car storage facilities are planned and sufficient space is available for necessary growth to meet any possible requirements. Avenues of approach for ship passengers and for motor trucks have been planned. These are so arranged that there will be no railroad grade crossings. A railroad car float service for the transfer of both passenger and freight trains for through service between the Pukow side and Nanking has been planned and ample provision is made for future expansion of the service. Space is available for a train ferry passenger station where passengers may be transferred at the port directly between ships and trains of the Tientsin-Pukow railway.

It is recommended that the location of the present ferry for local passengers (as distinct from the car float ferry referred to above) be changed, and that a new ferry terminal be provided at the west end of the Cheng Shan malu. This can be done at very little expense. A pontoon is needed for the landing of ferry boats and a waiting-room, ticket office and baggage-room should be provided. Through

(Continued on page 360)

Economic Co-operation of Japan and China in Manchuria and Mongolia

Its Motives and Basic Significance

By Yosuke Matsuoka, Vice-President of the South Manchuria Railway Company

I.—Internationalism in Manchuria and Mongolia

THE old conception of the State as an independent entity exclusively concerned with the pursuit of selfish national interest is no longer accepted as satisfactory by a world in which the interdependence of peoples is increasingly more obvious ; rather is it conceived of now as a free unit in an essentially co-operative society of nations, just as the individual man is a unit in society. We no longer apply a perverted Darwinism to the life of nations and conceive of international politics as a perpetual struggle for existence, as in the life of the jungle. We recognize co-existence and co-operative life as inherent features of human society. The world's statesmen who since the Great War have been seeking means by which lasting peace may be established agree on certain fundamentals, amongst them:—that every race should be protected in its right to existence : that every race has a right to equal opportunity for its enjoyment of civilization ; and that co-operation among the nations is the best road to this desirable end.

As this consciousness of the rights of other nations grows, we see a corresponding decline in the territorial ambitions which even recently were thought to be legitimate. While it may be long before the spirit of racial self-determination, or non-discrimination, exercises its full force in international life, it is gratifying to observe the increasing tendency to recognize the right of all states to equal treatment in the family of nations.

From this it follows that the nation which should attempt to monopolize a superfluity of national resources of which other nations stood in need would be open to condemnation from the international point of view. If the individual man is inalienably endowed with the right to life, liberty, and the pursuit of happiness, it follows that the individual nation's right to exist is no less sacred. If this is admitted, it follows that each nation should make its surplus resources available for the needs of others. President Wilson, in his memorable message of 1917, said in effect that though economic equality was impossible except through peaceful and co-operative development of the world's resources, yet every race had the right to be regarded as on a plane of equality. Policies which propose to assure the economic and political existence of any nation by means of international reciprocity and mutual aid stand therefore on unassailable grounds of reason and right.

Mr. Y. Matsuoka, Vice-President of the South Manchuria Railway

In discussing the economic co-operation of Japan and China in Manchuria, I wish to probe the question to the bottom, and to offer a solution which is not only the best that can be conceived of in existing circumstances but which conforms to the principles of international good will and mutuality invoked above. For the present purpose the question will be considered under four heads : namely, (1) the Russo-Japanese war and Manchuria ; (2) the Past and present of Manchuria ; (3) Japan and Manchuria ; (4) Economic co-operation of Japan and China.

II.—Russo-Japanese War and Manchuria

Russia, under the Tsarist régime, in its unbroken expansion to the east and to the south, swept over Mongolia and Manchuria. The advance of Russian influence, growing in its force and menace, placed our country in a position of extreme jeopardy. If Manchuria or Mongolia had been capable of holding their ground against the invading power, or if China had had adequate force to protect these countries, the Far East would have remained in undisturbed peace. It was unfortunate, indeed, that China found herself quite unable to cope with the situation, abandoning Mongolia and Manchuria to their fate. What was even more unfortunate was that China had at the time in charge of her affairs a statesman like Li Hung-chang who, as we know now, was not above virtually selling Mongolia and Manchuria to Russia in driving his own bargain which was eventually to plunge not only Japan but the whole Far East into perils of the most serious nature.

At this point, let me make it clear that Japan, at the time of her war with Russia, had but few nationals living in Manchuria. She had scarcely any investments or special interests in the balance. Japan found great cause for alarm in the attitude of China who had been showing herself ready to submit even to Russia's own terms. It was when Japan found that the situation, before which China remained indifferent, involved her own vital issues and her very existence as an independent nation that she had to go to war with Russia. In the wake of the war that Japan single-handed carried on successfully against Russia, Japan's influence began to move on into Manchurian territory. This coming of Japan into Manchuria was a natural consequence of her life and death struggle with an enemy which had cost her two billion gold yen and a hundred thousand lives ; and was not due to any aggressive designs on her part. The right of any race to live when presented on its minimum basis, is in any case a proposition that admits of no dispute and that is as a rule approved of not only on the international but also on humane grounds. Mongolia and Manchuria which China had at one time all but abandoned to the mercy of Russian invasion, have turned under Japan's helping hands into lands of peace and security, steadily advancing in civilization and developing on economic lines, with promise of even greater things for the future. Of this phase of the question, I am sure, the intelligent people of China are well aware. But I find it necessary to add one fact. At the armament limitation conference in Washington, it was made known that the immediate motive or cause for the great Russian advance into Manchurian territory was the agreement into which Li Hung-chang of China had entered with Lobanoff of Russia. China, having made a secret arrangement with Russia, was to have offered facilities to the Russian army on its southward advance, making a common enemy of Japan. When so much is known of the truth of the matter, we may say that China should find no ground for complaint against Japan's entry into Manchuria or as to the situation there as regards her own interests. I may perhaps go so far as to say that it is China's duty to weigh this particular aspect of the matter in a cool and fair frame of mind, even as is now done, I am pleased to note, in certain books of Chinese authorship.

III.—Past and Present of Manchuria

Now let us consider the case of Manchuria. We know that, until the advent of the Manchu dynasty, Manchuria remained separate from China proper, subject to perpetual disorder and disintegration due to tribal strife, where China could never make a legitimate territorial claim without meeting with challenge. The Manchu dynasty which had its origin in Manchuria set that portion of the country apart as a living place for its Manchurian guardsmen, preserving it as a source of revenue exclusively for their benefit under an independent administrative system. In other words, Manchuria was a crown land under the Manchu power, and was never made Chinese territory. Towards the last days of the Manchu dynasty so many immigrants began to come from China proper that Chinese elements grew predominant in the peninsular provinces of Manchuria. In later years, signs of agricultural labor began to be seen in the plains of which Changchun is the center. But Manchuria, even though placed under direct care of the ruling power, remained for the most part as it had ever been, uncultivated and without seeing the birth of any industry out of its marvellous resources. These conditions prevailed until the Russo-Japanese war. The coming of Japan into this country as guardian and guarantor of peace in the Far East brought many significant changes. The integrity of the territory was assured; railways were opened for traffic; capital was brought in. Industrial enterprises began to spring up. The population of the country increased apace.

In order to realize the progress and development made in Manchuria since Japan's coming there, nothing is more convincing than to compare the country at the present time with what it was two decades ago.

Mongolia and Manchuria are great agricultural domains. But the portals of these countries had remained closed to the inside no less than to the outside. When the Chinese Eastern Railway was completed, the side door was opened, as it were. The opening of the main portals did not come before the South Manchuria Railway Company had taken over operation of the railways. What Manchurian territory sorely needed was means of transportation rather than capital or labor. When Japan began to operate the railways on an economic basis, the situation was completely changed. Lands in the interior which had been left in neglect because there was no way to dispose of their produce now began to be cultivated. The South Manchuria Railway Company was soon to find the short line of railway under its charge, a matter then of no more than seven hundred miles, anything but adequate for its ambitious plan of opening up the country, and began to give encouragement to Chinese schemes of railway construction. Japan has consistently shown her readiness to aid such enterprises not only with adequate capital but also with expert knowledge and building material. In such manner four railway lines have now been completed; namely, the lines between Ssupingkai and Taonan, between Taonan and Angangchi, between Kirin and Changchun, and between Chinchou and Fuchou. It is interesting to note, too, that the great railway boom which we have of late been seeing in Manchuria and Mongolia is really due to the railway propaganda and campaign of Japan, and particularly of the South Manchuria Railway Company. The table below shows the development of railways in Manchuria.

TABLE I.—GROWTH OF RAILWAYS IN MANCHURIA

Year	Principal railways in operation	Miles in operation		Total	Population per mile	Mileage per 100 sq. ri
		Standard gauge	Light railway			
1908	South Manchuria Railway, Chinese Eastern Railway, Mukden-Peking, etc.	1,912	202	2,114	8,116	3.29
1915	In addition to above Kirin-Changchun Railway, Nuerho-Tayaokou Colliery Railway, etc.	2,182	32	2,214	9,084	3.44
1923	In addition to above, Ssupingkai-Taonan, Tumen-Tienpaoshan Lines, etc.	2,540	109	2,649	9,171	4.12
1928	In addition to above, Taonan-Angangchi, Mukden-Hailun, Hulan-Hailun, Takushan-Paiyintala, Chinchou-Pitzuwo Lines, etc.	3,306	141	3,447	7,982	5.36

This growth in railways has had remarkable effect upon the development of the country. J. O. P. Bland, in his *China, Japan and Korea*, says in speaking of the progress in Manchuria that the opening up of the country is seen in the peaceful invasion of Chinese settlers being pushed northward an average of four miles every year. A more definite idea of such change going on may be had from the following table compiled by our company.

TABLE II.—GROWTH OF CULTIVATED AREAS IN MANCHURIA

Year	Prov. of Mukden	Prov. of Kirin	Prov. of Amur	Total	Index No.
	cho	cho	cho	cho	
1908	4,125,600	2,817,360	1,104,840	8,047,800	100
1913	4,388,400	3,408,840	1,602,000	9,399,240	118
1918	4,651,200	4,000,320	2,099,150	10,750,680	134
1923	4,914,000	4,591,800	2,596,320	12,102,120	150
1927	5,124,240	5,064,980	2,994,050	13,183,270	164

What Manchura had lacked in the second place was labor. The situation was met by bringing in immigrant workmen from the provinces of Shantung and Chihli. For this purpose the South Manchuria Railway Company offered special facilities, granting each year free transportation to such men. The migration of agricultural hands has of recent years increased to more than a million annually, and they still continue to pour into the country like steady streams of water. The population of Manchuria has increased by ten millions approximately during the past twenty years, as shown in the table below.

TABLE III.—INCREASE IN POPULATION OF MANCHURIA

Year	Prov. of Mukden	Prov. of Kirin	Prov. of Amur	Total	Index No.
1908	10,769,000	4,553,300	1,806,900	17,156,200	100
1913	11,628,600	5,304,600	2,274,600	19,207,800	112
1918	12,526,600	6,179,500	2,862,400	21,568,500	126
1923	13,494,700	7,198,500	3,601,400	24,294,600	142
1928	13,591,100	8,766,800	5,154,900	27,512,800	160

It is obvious that this great increase in labor migration to Manchuria has gone some considerable way, if not exactly in a direct manner, toward making social adjustments within China proper. In this connection, I must refer particularly to the cases of Shantung and Chihli. When warlike disturbances devastated these provinces, Manchuria never failed to receive such of the inhabitants as chose to migrate, giving them places to live in and serving as a social safety-valve. For the benefit of these men and many others, Japan had virtually built at the outlay of billions of gold a wall of safety across the northern parts of China, making there a place of safe abode and lasting peace.

The third need of Manchuria was capital. The first people to come into the country, after its opening, were mostly drawn from the poorer classes for whom capital had to be found. What has been done and accomplished along this line since Japan set her hands to the task of opening up the country, may be best told by her investment now running up to some 1,500,000,000 in gold yen, as the following table shows :

TABLE IV.—JAPAN'S INVESTMENTS IN MANCHURIA

Investors		Investment	Amount
South Manchuria Railway Company	Direct Under-takings	Railways..	248,277,556
		Harbors and Wharves	59,789,109
		Vessels in Harbor service ..	4,044,933
		Coal mines	102,730,711
		Iron works	20,747,607
		Sanitation.	14,550,686
		Education.	13,489,848
		Municipal Undertakings. ..	134,979,952
		Other services	46,231,332
		Total	644,841,734
	Securities of affiliated companies and public bonds		55,287,181
	Loans to Chinese Railways and for encouraging Industries		59,452,855
	Deposits, Uncollected Credits, Cash Advanced for Contract Construction of Chinese Railways, etc.		150,528,206
Japanese Government	Loans to Chinese Government		98,730,823
Japanese *Corporations*	Loans to Chinese Government and Individuals		29,282,080
Japanese Corporations	Capital Funds invested by Corporations ..		439,003,410
Japanese Individuals	Capital Funds invested by Individuals ..		94,991,590
	Total		554,277,030
	Grand Total		1,563,177,829

These figures as compared with Japan's investment in Formosa and Korea, respectively of some Y. 355,000,000 and Y. 804,000,000 approximately, both Japan's own territory, show what great importance she attaches to the economic development of Manchuria.

The fourth problem to be dealt with was the domestic as well as foreign trade of Manchuria. Until the time of the Russo-Japanese war, Manchuria's entire foreign trade had been carried through the one port of Yingkou, and represented then a matter of but 58,000,000 taels per year. Under Japan's leadership, Manchuria's trade not only with Japan but other countries began to increase at so fast a pace that in 1927 the total of her foreign trade amounted to 670,000,000 taels or 35 cent. of China's entire foreign trade. This progress was made in the face of not a few obstacles placed in the path of development, such as compulsory circulation of the Mukden money, cornering by the Chinese authorities of certain products of the country, enforcement of unfair scale of duties, etc. It should also be pointed out to the credit of Japan that as much as eight per cent. of Manchuria's foreign trade at present passes through the three ports of South Manchuria, of which Dairen stands foremost.

TABLE V.—GROWTH OF MANCHURIA'S FOREIGN TRADE

Year	Districts	Imports	Exports	Total	Comparison between S. Manchuria, N. Manchuria and East Manchuria
1908	S. Manchuria	45,760,011	30,085,304	82,845,315	82
	N. Manchuria	7,352,023	10,499,819	17,851,842	18
	E. Manchuria	—	—	—	—
	Total	53,112,034	47,585,123	100,697,157	
1913	S. Manchuria	82,121,464	78,269,999	160,389,463	67
	N. Manchuria	42,295,601	34,075,048	76,352,649	28
	E. Manchuria	1,266,595	716,952	1,983,547	5
	Total	125,683,660	113,041,999	238,725,659	
1918	S. Manchuria	152,160,860	140,296,177	292,457,037	85
	N. Manchuria	22,889,952	24,713,189	47,603,141	14
	E. Manchuria	2,168,346	1,846,800	4,015,146	1
	Total	177,219,156	196,856,166	344,075,322	
1923	S. Manchuria	188,042,348	246,748,055	434,790,403	87
	N. Manchuria	14,719,864	44,865,889	59,585,753	12
	E. Manchuria	4,293,016	2,314,697	6,608,012	2
	Total	207,055,228	239,928,940	500,984,168	
1927	S. Manchuria	238,052,185	327,604,823	565,657,008	84
	N. Manchuria	24,446,314	75,049,680	99,495,994	15
	E. Manchuria	6,415,087	5,381,676	11,796,763	1
	Total	268,913,586	408,036,179	676,949,765	

After going over the above figures, I might perhaps be forgiven for the pride with which I point to all these changes wrought in Manchuria and say that these are the fruit of the colossal effort that Japan has kept up through the past twenty years, and that in the vast lands of Manchuria, left in neglect through centuries, Japan found opportunities of serving the world by advancing its material wealth and thereby doing her duty as a member of international society.

IV.—Japan and Manchuria

Now I propose to look into the question of Manchuria from Japan's point of view. If I am right in the premise that what lies at the root of international peace is protection of every race in its right to live and recognition of its legitimate aspirations, it follows that the people of Japan, upon whom rests a due share of responsibility for the world's peace, should have the right to ask for the security of their national existence, with assurance as to their opportunity of progress and growth for the future. I mean to say that Japan, as is generally known, finds herself face to face with a situation arising from her over-population, her small territory, and her lack of raw materials. To these questions at issue she must needs find an answer if her existence as an independent nation is to be assured. She has reached the point where she can no longer afford to deal with these matters except in the spirit of candour. Provided such Japanese ideas be not incompatible with the peace of the world, her expression should receive due respect as based on the legitimate rights of a nation which is compelled to find an outlet somewhere. It is for this very reason that Japan's special position in Manchuria and Mongolia has virtually been recognized, directly or indirectly, by the Powers.

From the same point of view I may say that were China to deny other peoples the opportunity of sharing the benefit of her rich resources for no other reason than that they lie within her territory, she would indeed be laying herself open to criticism. It would be but meet that Manchuria should be thrown open in international ways, to benefit the Chinese as much as others who may care to come there to work to bring out what lies still hidden deep in that vast land. It is not improper that Japan, in view of the question as something in which her own right to exist is involved, should so interest herself as to ask China to give greater attention to the possibilities in Mongolia and Manchuria and turn them to good account for the benefit of mankind. Even more so when we know that the relations between Japan and China are based on what was sanctioned by a treaty made as between two equal nations.

It must be said that the relations of these two countries as regards Manchuria have never been those of the strong and the weak, or of the conqueror and the conquered. Japan has neither design upon Manchurian territory nor the intention to monopolize the riches there. The development of Manchuria and Mongolia is and should be, first and last, for the benefit of these countries themselves. We know at the same time that no consideration in the interest of these countries is necessarily incompatible with the question of relieving the situation of Japan as regards her national life. On the contrary, a wealthier better developed Manchuria, we know, will mean greater prosperity to Japan and her people. Increase in Japan's demand for Manchurian products will not only have the effect of stimulating development of Manchuria and Mongolia, but will also impress China with the importance of such development. The correlation thus existing between Japan and China is bound, from the very nature of the thing, to work for the good of one as well as the other, ultimately serving the international life of the whole world. In brief, if Japan's situation as regards Manchuria is as above described, and if the relations between Japan and Manchuria are as above set forth, Japan may truly be expected to show as much zeal as ever in aiding the work of developing Manchuria which her people will come to look on more and more in the light of a land with possibilities of aiding in solution of the question with which their national life is so acutely concerned.

V.—Economic Co-operation of Japan and China

I hope I am not to be misunderstood as saying that Japan may advance herself materially in Manchuria through her own effort alone ; for such is not my meaning. It is obvious that

Japan can never hope really to succeed without friendly and effective co-operation on the part of her neighbor. It means simply as a matter of fact that Japan can not profit herself in Manchuria without profiting China in a like manner. When the question of developing the country and people of Manchuria affects Japan as closely and vitally as China, any ideas except of friendly co-operation between these two nations seem so out of place.

In looking over the relations between Japan and Manchuria, as they have existed for these past twenty years, I am struck by a certain feature of impressive character. Japan and Manchuria have stood, and stand now for that matter, in the position respectively of consumer and supplier, speaking in the technical sense of the terms. What is remarkable in the case is that the consumer himself has at the same time been investor, assuming leadership in all enterprises, and has also attended to the work of protecting such undertakings. While working to advance production for supply on one hand, Japan has been buying such products on the other at fair prices. In such relations have Japan and Manchuria followed one road of common interest each for its own well-being.

In speaking here of the common interest and co-existence of Japan and China, I wish particularly to emphasize that in the relations between these two nations all should be grounded on the basic principles of internationalism, and that in all cases China should first be considered, with due regard next for Russia, Britain, America or any other nations holding interests in Manchuria. It is to be admitted that Japan has not infrequently suffered from misunderstandings born of prejudiced or calculating minds. Japan, as an outcome of the war, had suddenly to step forth and attend to a task she was but little prepared for. But no critic, unless seriously misinformed, can say that Japan has been influenced by territorial ambition or guilty of exclusivism against other nations. We know from history that there is no instance of any particular country placed out of the world's routes of trade or traffic having attained to prosperity or importance. We know therefore that the open door and equal opportunity are the most important factors in leading Manchuria along the path of international growth. Of all this we are conscious when we emphasize the importance of internationalism in Manchuria. In short, Japan, in all matters of Manchuria, should find common ground of agreement with China as well as other nations, from her economic point of view, joining her work with that of others to the end of adding to the material wealth and happiness of the world.

In speaking of the vital points in the Manchurian question in a more concrete way, what we stand in need of, above all else, is an economic policy to be laid along clear-cut and definite lines. As for social programs, they are so inevitably allied with the economic growth of society that I wish to take them here all for granted, without going into their discussion.

It is in transportation that Japan and China should co-operate, before all else, in their work of opening up Manchuria. Needless to say, the volume, intensity, safety and accuracy of transportation have close bearings upon political, economic, social and many other phases of society. In the case of the South Manchuria Railway Company, its work goes beyond that point; for it has internally brought on a new era in the development of the resources of the country, and externally it has made itself very important as the last link in the great international route of traffic with the European continent. But except these railways of not more than 3,300 miles and the light railways of but 141 miles, there are scarcely any roads worthy of the name in any portion of the vast country of Mongolia or Manchuria. A step out of the railway zone, there are no places where people other than natives may lodge or may travel without fear of bandits. When these conditions actually exist, little need be said as to the importance of framing adequate railway schemes to make Manchuria a country of safe travel and free traffic.

In the second place, we should do something with the legal and legislative institutions of the country as well as customs and usages of its people, so as to bring them more or less into uniformity with the standards prevailing elsewhere. In the fields of business and law and other phases of life, foreign people find not a few things painfully different from their own. As an instance close at hand, I may refer to the Manchuria standards of weight and measure which are so confusing that much inconvenience is met with in transferring goods from one railway to another, not to speak of trouble in private transactions. It is also necessary that knowledge of economic science should be made more popular. There are many possibilities of raising efficiency in work by making effective use of machinery and man power, and many points where a study of raw materials may be made to good purpose. In the vast but partially opened country of Mongolia and Manchuria, labor is being wasted on many sides. At every turn almost, we fall upon something whose economic value may well be advanced.

In short, we know that in the fields of transportation and law and legislature, and in the matters of customs and usages, there are numberless things which need but a touch of the magic wand of scientific knowledge to give them great use and value. Alive to these existing conditions, we propose first to establish economic programs for Manchuria before we seek to lead the country deeper into relations of international family life. Nor are we blind to the difficult work such programs really involve. Success will never be attainable unless the work is carried on in full appreciation of the basic lines along which Manchuria should be developed. The matter is plain: Japan may no more force her way than China, and their ways are equally clear. For Japan or China there is no rule except that of equal opportunity for all Powers; and for each of them but one road of friendly partnership in the task of leading and establishing Manchuria in its international position. If Japan shares with China such benefits as come of the same undertaking, we can conceive no reason why China should ever find cause for displeasure, actually or theoretically. It is as difficult to imagine that internationalism, though a strong enough factor as the demand of the times, should ever work against these two nations when they, assuming leadership in the development of Manchuria, show themselves united in a solidarity of interest. To this they will and must come, as the only true way. We know that Japan has spent billions in Manchuria, and has turned the best of her talent to work out her ideas there. It is as generally known that to this effort of Japan Manchuria owes what she is to-day. And to this I again refer, because I cannot but look upon it in the light of the very truth confirming us in the thought that Japan and China are here thrown into each other's arms, willy-nilly, to work out their destinies. It is because we propose to follow the true path of international family life and to serve its purpose that we are so emphatic in advocating the economic co-operation of Japan and China and earnest in our hope that consummation of such an ideal will surely come in good season.

Dollar Radio Contract

The following is the complete text of the contract entered into between the Dollar Steamship Company and the Chinese National Construction Commission, for the construction of a high-power radio station at Shanghai for the joint use of the Company and the National Government.

The National Construction Commission, (hereinafter called "The Commission"), and the Robert Dollar Company, a corporation organized and existing under the laws of the State of California, United States of America, (hereinafter called "The Company.")

Whereas, the Commission and the Company mutually desire immediately to establish and operate a special radio station capable of assuring direct radio service between China and Honolulu, they have, in and for the consideration hereinafter named, agreed upon the following:

1. The Commission shall build and install one short wave radio station, capable of direct communication with Honolulu for both day and night service, and shall assign to the Company the special use thereof for the receipt and transmission of all messages as specified under Paragraph 7-9 inclusively.

2. The Company shall deposit with the Commission ninety-five (95) per cent. of the total cost of said station's erection and equipment, which deposit shall be forthwith refunded to the Company upon the cancellation of these presents.

3. The Commission shall have entire charge over said station for its proper maintenance and efficient operation, and shall bear all expense connected therewith, but the Chief Operator, in immediate charge of said station, shall be a qualified man mutually satisfactory to the Commission and the Company.

4. The Company shall pay to the Commission the following, as rental for the services of said station :

(a) The monthly cost of operating said station, including salaries, wages, rent, light, power and supplies, the amounts whereof shall be mutually agreed upon.

(b) The monthly proportion of interest on five (5%) per cent. of the cost of said station, at the rate of ten (10%) per cent. per annum.

(c) The monthly proportion of depreciation at ten (10%) per cent. per annum on the cost of said station.

(d) The monthly proportion of a royalty of Sixty-five Hundred ($6,500.00) Dollars, Shanghai silver currency, per annum for the privilege of said station and its services.

5. It is mutually understood and agreed that, should the said station become obsolete before the expiration of ten (10) years from the date of its construction, the Company shall pay to the Commission the difference between the cost of said station and the amount already paid as depreciation under Section *c* of Paragraph 4 above, said sum so to be paid to be deducted from the ninety-five (95) per cent. deposit provided for in Paragraph 2 above. In the event of any dispute as to whether or not said station is obsolete, the same shall be decided by a representative to be appointed by the Commission and one to be appointed by the Company. Should these two representatives be unable to agree, they shall appoint a third party to assist them. The decision of a majority shall be final and binding on both the Commission and the Company.

6. It is further mutually understood and agreed that the amount of depreciation provided for in Section *c* of Paragraph 4 above, shall be paid only until such time as the Commission shall have been reimbursed for the total value of said station thru such depreciation payments.

7. The said station shall handle free of charge, all the messages of the Company's own business transactions including such messages from shore to ship and from ship to shore, but no other commercial traffic by the Company is permitted.

8. In the event of congestion or breakdown of any of its stations, the Commission shall have the right of utilizing this special station for the transmission of commercial messages with the Radio Corporation of the Philippines or the Radio Corporation of America, provided that such use shall not interfere with the messages of the Company.

9. In the event of breakdown of this special station, the messages specified in Paragraph 7 above may be turned over to the Commission for transmission without further charge to the Company other than the payment of that part of the charge which is due to the Radio Corporation of the Philippines or the Radio Corporation of America, provided the stations under the full control of the Commission have the facility to do so.

10. The location of the control station shall be selected by mutual agreement, but the site of the transmitting plant shall be decided by the Commission.

11. This Agreement shall continue indefinitely but the Commission reserves the right to cancel the same at any time with four (4) months previous notice in writing to the Company and by complying with the provisions of Paragraph 2 above. The Company shall have a like right of cancellation by a similar notice to the Commission but, should the Company at any time elect to cancel, it shall reimburse the Commission for the cost of said station, less such amounts as may have already been paid thereto as depreciation under Section *c* of Paragraph 4 above.

12. It is lastly understood and agreed that this Agreement shall be drawn up in duplicate in both Chinese and English, each party to have a copy of both texts but, should there be any difference in interpretation, the English text shall prevail.

In Witness whereof, the parties hereto have caused this Agreement to be executed by their respective officials, duly authorized this 31st. day of May, Nineteen Hundred and Twenty-nine (1929) at Shanghai, China.

Attest : National Construction Commission
Hsu En-tsung Chang Ching-kiang
(Sg. in Chinese) By (Sg. in Chinese)
Chairman

Attest : The Robert Dollar Company
(Sgd.) Edgar M. Wilson. By (Sgd.) O. G. Steen
Its Attorney-in-fact

Singapore's Control of Key Mineral Resources*

By H. Foster Bain

SPECIFIC localities are frequently of immense importance ; this importance may of course alter with changing vogues in transportation and communications, but in some instances it endures for centuries. With the opening of the Cape route to India, Venice lost much of the position it held in the Middle Ages. St. Louis dropped behind Chicago when river steamboats gave way to railroads and the Great Lakes became a great trade route. But London, at the mouth of the Thames, has been an important center since pre-Roman days and bids fair to continue to hold place. So, too, New York at the mouth of the Hudson seems secure in her position of power—though just what effect air travel ultimately may have on the commercial map of the world is not yet settled. British territory at Gibraltar covers less than two square miles, but it is adequate to dominate the entrance and exit of the Mediterranean.

Panama and Singapore are the two great gateways to the Pacific, the ocean of the future. In the Canal Zone, with 553 square miles area, the United States holds (let us hope for peace rather than war) one of these great gateways. Opposite lies Singapore,† an outpost of British dominion. Ships trading between the Pacific and other oceans must pass through one of these two gateways or else make a roundabout and expensive journey. Singapore, then, is one of the critical centers of the world, and the forces that control it and the resources of the people resident around it offer subjects well worth study.

In considering this Singapore region one commonly thinks in terms of British, Dutch, Japanese and American interests. While all four of these nations have significant positions in relation to the Straits, it must not be overlooked that the people who actually live there are overwhelmingly of the Malay race. At present their political activities are controlled by these outsiders, but whether

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***Foreign Affairs* (American), July 1929.

†Cf. "The Strategy of Singapore," by Nicholas Roosevelt, *Foreign Affairs*, Vol. 7, No. 2, p. 317. Also see "Ores and Industry in the Far East," by H. Foster Bain, published in 1927 by the Council on Foreign Relations, New York.

a small foreign minority can permanently remain in a dominant position in a country if the native population will the contrary, is open to question. But these are problems of the character and wishes of the Malays, and though they must not be forgotten in any study regarding the future of the region they cannot be taken up at this time. Nor will this brief article deal with the plant and animal wealth of the Singapore region. Attention will be directed principally to its mineral resources.

Mineral resources are of particular importance to the development and maintenance of a culture such as now characterizes the western world. Minerals are the materials which nourish the growth of modern civilization. They are absolutely essential for the enrichment of life and the building up of permanent wealth. Indeed, the great bulk of the world's heritage of tangible material riches from generation to generation consists of mineral products. Accordingly, in considering whether the region around Singapore is ever likely to become an important center of civilization of the western type, the presence or absence of adequate mineral supplies is a consideration of first importance. Furthermore, this great commercial gateway's relation to mineral fields is also significant.

In considering the rôle of minerals in the strategy of nations both for war and peace we distinguish three classes : first, the " tonnage minerals," such as coal and iron, which enter into modern industry so extensively that any particular country's lack of them puts it under bonds to keep the peace ; second, the " pound minerals," such as copper and lead, which, while highly important and useful, can be purchased at a price and even stored in quantities sufficient for the prosecution of a short war ; third, the " ounce minerals," such as platinum and gold, which are essential and expensive but of which an adequate supply can be smuggled through even in time of war if sufficient credit for their purchase be available. In evaluating the minerals of any region, and assigning them to a particular class, we naturally are able to speak only from the point of view of present technology of production, or its probable development. Changes in technology may at some time in the future materially alter the present status.

At the present time Malaya's most significant contribution to the international trade in minerals is in tin—a " pound " mineral —and in petroleum—a " tonnage " mineral. The region yields 60 per cent. of the world's supply of tin, and it is of a grade that fixes the standard for all other countries. Of petroleum the Netherlands Indies yields about 2 per cent. of the world's supply ; while the amount has increased steadily from year to year, its ratio to the world's supply as a whole has remained substantially the same.

The tin comes mainly from a belt stretching from Southern Burma, through Western Siam, the length of the Malay peninsula and into the islands of Banka, Billeton and Singkep in the Dutch territory. Production in the past has been principally from placers, and lodes have not as yet been found in number and size sufficient to warrant belief that the present rate of production can be maintained when the placers become exhausted. At any rate, the area seems certain to lose its dominant position among the world's tin fields.

As regards petroleum the situation is quite different. So far, the fields in Sumatra have been skilfully husbanded in order that advantage may be taken of their strategic position as producers of high-grade crude oil for the Eastern market. The highly competitive and economically wasteful methods that have attended the great expansion of American production have not been permitted in the Indies, and while there are now American as well as Dutch-British interests in the fields, it is to be expected and hoped that the same conservative course will be followed. Throughout the East Indies and in the Philippines are areas of rocks similar to those that elsewhere yield petroleum in quantity. They afford favorable fields for prospecting, and while the only determined and well-conducted venture as yet made in the Philippines did not result in finding oil, it is entirely probable that as the world demand becomes greater larger supplies will be found in the Singapore region. Siam and the Malay States of the peninsula are not likely to prove important in this connection.

As for coal and iron, those two great wonder-working twins of modern industry, Malaya is neither barren nor is it (if present methods alone be taken into account) in a position to play any large part in the world's trade and industry. Coal, especially, is far less abundant in quantity or satisfactory in quality than might be wished. There is one mine in the Federated Malay States and there are a number of small ones in the Philippines. Persistent efforts and a considerable expenditure of public money have failed to result in opening a colliery of any size or significance in the Islands. Sufficient is known of the geology to make it reasonably clear that neither in the Philippines, the Malay States nor in Siam will any large body of workable coal be found, or any quantity of coking coal, that most essential requisite to a modern steel industry. In the Netherlands East Indies and Borneo coal is present in quantity. In general, it is of low to moderate heating value and needs special facilities for burning with economy. All search has so far failed to develop from these coals any satisfactory coke for use in making iron and steel.

This is all the more unfortunate since both in the Philippines and in the Netherlands Indies large iron ore resources are known to be present and well situated for mining and transportation. While moderate amounts of hard ores are known, the great reserves (and they are truly great, running into hundreds of millions of tons) are of the lateritic type, of which the value was first recognized in Cuba. Such ores require preliminary preparation to prepare them for furnace use, but the necessity for this preliminary processing is offset in part by their occurrence at the surface in excellent position for cheap mining and near deep water both in Cuba and the Far East. A more important factor in preventing their wide use is the presence in them of nickel and chromium, which influence the character of the iron made from the ore without being in the correct proportions to give the latter proper characteristics for many uses. They yield a special iron, or steel, or particular value for some uses, such as rail making, but not desirable for foundry work or as making sheets and ship plates. Much study has been directed toward removing these secondary metals and recovering them as valuable by-products. If this technology is placed on a working basis, Malaya may make important contributions to the world's iron supply. Until then the not too brilliant prospect seems confined to the possible shipping of nodulized iron ore to Japan or North China.

Tropical regions are those in which bauxite as well as lateritic iron ore are most commonly found. Bauxite, the ore from which aluminum is made, is known to be present in widely scattered areas in Malaya, but so far no adequate survey has been made to determine its distribution and availability. It is entirely possible that after water power has been developed there the region may become an important source of supply. There is manganese, too, but whether in quantities more than enough to supply local needs is not certainly known.

Of the " pound " minerals in general—copper, lead, zinc and others (except tin, already discussed)—it need only be said that while they are present and widely distributed no mines or districts of world significance have as yet been found and there are no particularly brilliant prospects. As to the " ounce " minerals the situation is different. Platinum, gold, silver and diamonds all occur, and in Sumatra three really great gold mines and one manganese-silver mine have already been developed. In the Philippines and elsewhere smaller deposits have been mined. As rich mines of the rare and precious metals are found from time to time, they will by so much increase the purchasing power of the people of the region and help to develop trade.

Let me now sum up. In general, the mineral resources of the region are varied and may be expected to contribute materially to the world's trade and industry. Its petroleum and coal, supplemented by water power, may be expected, as elsewhere, to lengthen the arms of men and put power in their hands. No large development of the heavy industries based on iron and steel is to be anticipated, despite the presence of great iron ore fields, unless a new technology is developed. The region may become an important source of the light metals, seems unlikely to yield the ordinary non-ferrous metals in quantity aside from tin, chromium and possibly nickel, has at least moderate resources in manganese and other minor minerals, and may be expected to continue contributing to the world's supplies of gold, silver and diamonds. Just what the Malays or those who control them will make of these resources is field for another study.

At the present time, Malaya's chief mineral significance derives from its being the dominating source of the world's tin. That mineral is peculiarly necessary under modern conditions of life because its non-toxic quality permits its use in the manufacture of food containers ; with modern emphasis on the storage and wide distribution of food, a metallic container has advantages—and no entirely satisfactory substitute for tin has yet been found. The demand for tin increases faster than geologists and engineers bring in new supplies; they, and the research workers who are trying to develop substitutes, are in a race against the exhaustion of known deposits.

The region's second significant feature is the presence of the only large oil fields known to exist in the very heart of the densely populated Far East. To the extent that western modes of living come to be more generally adopted, these oil fields will prove increasingly valuable. To a less degree the coal fields of Sumatra, midway between those of New South Wales, India and China, also occupy a strategic advantage. Perhaps in the long run they may prove even more important than the petroleum fields, since the handicap of low quality will probably be overcome as technology is improved, and on the score of quantity there is every reason to believe that the coal outranks the oil. When the latter becomes scarce the coal will still be abundant.

But the big resource, the one that in the long run is likely to prove most important of all, is the iron ore. In present conditions it is under heavy handicaps, but such a great body of the world's most significant metal, even though it is of low grade, seems certain to be requisitioned in course of time. How rapidly this will happen, with all the resultant changes in the industrial life of Malaya, depends on many world factors quite separate from the mere presence or absence of minerals in this particular region.

The Boxer Indemnity and Railways

By H. Stringer

WITH the astute Ministers of the Nationalist Government, having the ear of Foreign Ministers of most European nations, there would seem to be now some chance of the Boxer Indemnity Funds providing the Chinese nation with education, industry and capital through railway expansion.

The Commission sent out in 1926 to decide on the allocation of the British portion of this Indemnity decided for education. This decision was largely influenced by the apparent tendency of the railways to become centres of disturbance. Against this argument it may be said that the railways have concentrated disturbance and devastation and made for a fight to finish. The railways quicken exhaustion in the combatants, for he who holds them keeps the arteries of life, his opponents became a minor disease of which time is the simple cure. Without railways the task of pacification of the whole country would have been impossible, and China would have drifted into another Taiping Rebellion of fourteen or more years' duration, whereas the only plague spots of unrest are now the inaccessible districts of Szechuen, Shansi and Kansu.

China may be at the dawn of a period of some years of quietude, and if she is, there is no national asset so innately healthy as the railways. Within a week of the termination of military control in 1924, the Peking-Mukden Railway receipts went up to $2,000,000 a month; and this average was maintained and even exceeded later. The release of the Shanghai-Nanking Railway to civil control after the late hostilities was followed by an almost immediate return to a paying basis.

To anyone familiar with the conditions of a district before it was tapped by a railway, the ultimate benefit of railways must be unquestioned. Take, for instance, the northern portion of Anhui Province before the Tsin-Pu Railway traversed it. This district had been devastated repeatedly during the Taiping Rebellion. It had never recovered, cities were ruinous and empty, inns were miserable, roads worse, and brigandage rife. Further, in a stretch of some 150 miles the following currencies were in use. The paper dollar of Nanking and the Mexican dollar held good for 30 miles, a Portuguese silver dollar of 1793 replaced this for the next 70 miles, 1,000-cash notes and copper coinage ran for a further 30 miles and, beyond this, the ancient strings of cash. Further standards of length and capacity varied from village to village, and for the average villager the stinking medley of lanes which made a market town was the hub of the universe, the Mecca of immeasurable delights. The crowds which flocked to gaze at railway surveyors were an offence to eye and nose, parchment-pale with undernourishment, racked with tubercular coughs, afflicted with a Job's collection of sores. The physical decadence of isolation was only too apparent in the prevalence of harelip, general deformities, and a grade of mentality bordering on idiocy. The people were picturesque at a distance, because their patched garments had the mellowness of great age. They blended well with the anaemic colouring of their sparse crops, the produce of starved land for centuries unrested and overworked.

Flood overwhelmed the northern portion of this district in the summer of 1911. The villages became mere heaps of stinking slime, damp islands in the slurry of the fields where rotten crops lay bleaching. Draught animals were drowned in heaps, the seed-corn spoilt, the land too soured by inundation to get an autumn crop. Famine gripped some hundreds of square miles in the late autumn. There had always been a hair's breadth between staving the pangs of hunger and starvation. Grass and the bark of trees became the food of most, beancake the staple diet of the lucky few with money enough to buy it. Typhus followed as a natural consequence, and death was ever present, in work, in walks, about one's house. Thousands died, and as many more were saved solely because the new unfinished railway was able to provide a limited amount of transport to the Red Cross. If morbidly inclined, imagine the famine of 1922 in Shantung without rail connection to Manchuria and recollect that 8 millions died in Chihli, Shantung and Shansi in 1887 for lack of transport and no roads worthy of the name.

On humanitarium grounds the case for railways is unquestionably strong. It is equally so on the economic score. Within a year of the establishment of through rail-connection on the railway in question, currency difficulties had disappeared. The line became an artery of trade. Most people have heard of Pengpu to-day, a flourishing town, in 1908 a string of hovels on a muddy lane—kennels for some 200 starvelings. Nanhsuchow and Hsuchowfu in pre-railway days were known only to students of the postal directory as dependent on couriers for letters, and for telegrams, on a telegraph-line generally deeply engaged in the promulgation of a five-column edict from Peking. To-day they have electric light. Paved roads edged with solid houses link the city and the station, a brown scar in green fields when first the railway came. Remember also that these railway towns have doctors and hospitals of various grades. Relief of some sort is now within the reach of many who once were doomed by ignorance and isolation.

So much for the tendencies of railway expansion. Consider now the tendencies of Western education in China. Here we have a longer period for observation than in the case of railways. The first educational mission was that of Yung Wing, which left China for the United States in 1875. Very many of its members became prominent men of affairs, but they had to wait for many years before coming into their own. The Empress Dowager would have none of the New Learning; the Emperor's madness of 1898 had come too near success. Root and branch the Empress did her best to kill a poisonous growth, as she conceived it, and she was well served. The Yamens took their lead. Oh yes! the old style examinations were abolished in 1904, but it was not until 1906 that official examinations were renewed on modern lines, and then no successful candidates found employment. A few of the foreign-educated found positions with the far-sighted officials who recognized the futility and danger of the policy of exclusion. Li Hung-chang gave limited opportunities. Tang Shao-yi was a protégé of Yuan Shih-kai. Jeme Tien-yu, China's foremost engineer, came to the front under Yuan.

But these were the men not to be denied. The small fry who got a half-education in Japan were ignored, and formed the uncleus of the " China for the Chinese " and " Sovereign Rights " party, which created the pother over the Shanghai-Hangchow Railway loan in 1908. Then came the millenium of 1911, and the student had his chance at last. He failed, he merely talked and squeezed, whereas the old official squeezed, but now and then did something astonishingly tangible and wise. The student was the proverbial unproductive crystal egg.

Then the soldier took a hand in government and discovered his power after Yuan Shih-kai's death in 1916. The semi-educated malcontent has been on the increase ever since 1914, when the War set back the dawning era of industrial expansion. Such expansion really hinged on railways, and railway-construction ceased then. The number of students increased every year, but capacity to employ these men did not increase with the largest industrial undertaking in the country merely marking time.

America had also largely increased facilities for foreign education by allocation of a portion of her Boxer Indemnity to this purpose in 1908. The railways, telegraphs and other government undertakings have done their best to absorb these with a claim on the government, but these departments are so overstaffed that there is little for the men to do outside a dull routine. There is no chance of rapid promotion, and no chance of acquiring experience as there is no money for expansion. Thus even government henchmen drift into teashop treason and minor plottings. For the ordinary-student the creation of disturbance has become a profession, unless he has had the good sense to soil his hands with trade. There is no scope for education without employment, and the undertaking which gives greatest employment for the educated men for least capital is unquestionably railways. To give further facilities for education without expenditure on the provision of employment is merely adding to the present discontents and also adding to a permanently restless, unemployable, and very dangerous class, simply because they have the ear of the simplest and most gullible mob in the world.

The case for medical education is not a strong one. Doctors and hospitals are undoubtedly needed. But medical education, as Kipling's Lama remarked of all learning, " is of no earthly use unless of best sorts." The course is expensive in any case, and in China it is complicated by having to learn in a foreign language in most institutions.

A lengthy course is distasteful to the Chinese mind. The Chinaman always expects a quick return for his money. The student of medicine is, as often as not, content to leave the university unqualified, but with that dangerous half-knowledge which suffices for the modern doctor in the remoter cities.

What is true of medicine applies to other professions. The Chinese student has yet to find out that there is no royal road to sound learning. Mental indigestion is the chronic disease of Yong China of to-day. Mental exercise on practical problems, not Marxian or Anarchist theories, is the cure for this ailment, and, until this can be provided, the use of the Boxer Indemnity for education can surely only be attractive to those with a belief in " Cast thy bread upon the waters and it shall return after many days."

That there is some case for the use of this money for railways will, perhaps, be conceded. The question of the best way of using the money needs a little consideration.

The British share of the Boxer Indemnity was in 1920 £11,180,000, or say 100 million dollars. This money, at $90,000 per mile, would build, say 1,250 miles of railway (equipped with a 60-lb. rail) in easy country, or, taking the cost of the Lung-Hai Railway (which has been constructed spasmodically but with comparatively little obstruction), at a cost of $12,000 per mile, say 830 miles.

Of this expenditure at least 30 per cent, or say $40,000 per mile, is for imported material, which is, presumably, in this case, to be of British origin.

This would total for the whole of the 830 miles, a sum of $33,200,000, or £3,465,710 at the present rate of exchange.

The net revenue which would accrue to an extremely needy Government totals $9,150 per mile per annum, or a total of $7,600,000 annually for the 830 miles. This is on the basis of the Government Returns of 1922 ; it is the average for the whole of the railways for a year of war and disturbance.

An efficiently managed railway in China will pay its operating expenses in a couple of years, and the line could not fail to be on a paying basis in three to four years at the outside. if the money was wisely spent on suitable projects.

In this last connection it is as well to mention that there are quite a number of abandoned railway projects in the country at the present time, on which there has been considerable expenditure.

The estimated amount of this is as in the table below :—

	Approximate Expenditure
Hankow-Szechuen	£1,000,000
Pukow-Sinyang	207,000
Nanking-Hunan	200,000
Ching-Yu Railway	1,085,000
Pin Hui	100,000
Peking-Suiyang	800,000
	£3,392,000

To these may be added the Canton-Hankow Railway, the enormous expenditure on which must remain of limited usefulness until through connection to Canton is made.

There should undoubtedly be an effort to make these derelict investments productive.

It would, however, be infinitely better to keep this money permanently under a Sino-British Board of control and allocate the yearly income as required, either for urgent railway expansion or for renewal of rolling stock, etc. Income at 6 per cent. from 100 million dollars is $6,000,000 annually, which would suffice to build at the rate of say 100 miles a year. Thus gradually the mileage under what we will call the Boxer Indemnity Board would increase, and China would have at last, to a limited extent certainly, a yearly construction programme which would ensure a greater rate of expansion than has obtained since the War. Thus also would be created a permanent construction staff of engineers, men who would have no chance of rusting under the influence of years of maintenance routine.

There is no reason why such a Board would not work well. It has succeeded admirably in the case of the International Famine Relief Association. Members of the Board would be selected from officials of the Government Railways.

The money available for extension would also increase yearly, as it would, of course, be a *sine qua non* that all surplus revenues from Boxer-built lines would be allocated to new construction.

Dirigible Air Service for the Pacific

THE linking of the United States with China and Japan within three years by the establishment of a dirigible air mail and passenger service across the Pacific, is now well within the realms of possibility. The establishment of such a service is receiving particular attention by a group headed by Paul W. Litchfield, president of the Goodrich-Zeppelin Company of Akron, Ohio, and composed of such leaders in commercial aviation as C. M. Keyes and his financial associates. The Dollar steamship interests are also reported to be negotiating with the Goodyear-Zeppelin Company looking towards the establishment of such a service.

The contemplated air service calls for the construction of two super-dirigibles of 6,500,000 cubic feet capacity each, with accommodations for 60 to 100 passengers and cargo space for from 10,000 to 20,000 pounds of mail, express and baggage. The cost of establishing the service would be, according to its promoters, about $10,000,000, each ship to cost $4,500,000. With a contemplated speed of 100 miles an hour, these air liners under favorable conditions would reduce the traffic time between the coast and Tokyo to about 60 hours. The trip from Los Angeles to Honolulu is calculated to take 36 hours in going and 48 hours in returning.

Although the project is still in the conversational stage, all the necessary capital is available. The contemplated company will not be confined to any group or groups in American aviation but every air line in the country will be asked to come in and co-operate as will all railway and steamship transportation systems.

The first step in the scheme is to establish a service between Los Angeles and Honolulu. If this is successful, it will be extended to Japan, China, Philippines and Australia. Considerable impetus was given to the project in May, when Mr. Litchfield called upon President Hoover and secured from him a statement in which he is reported to have said that, quick communication is an advantage not only to the government in maintaining good international relations, but in leading to trade expansion and that any money the government might be called upon to expend within reason comes back three-fold indirectly. The promoters base their hope of success upon obtaining from the government a mail contract and if the support of the Post Office, Navy and Commerce Departments is obtained, the financial interests behind the project will immediately go ahead with it. Senator Burton is to introduce a bill in Congress at the regular session in December authorizing the Post Office to make contracts with the line as present legislation covers only mail contracts with steamship lines.

Mr. Litchfield estimates that with the mail contract and what few passengers the line might get the first year, the company would be able to meet current expenses. However, the dirigibles would not carry passengers until it had been shown that the service could be maintained safely. In a newspaper interview, Mr. Litchfield said that at the end of nine months we might offer passenger service. But we cannot go ahead unless we obtain the mail for the Hawaiian Islands, and make arrangements with transcontinental flying machines for carrying their express to the Islands.

"It is our opinion that if we have the mail contract for three years we can operate without a loss, and at the end of that time we hope to build up a passenger service which would give a good return on the investment. But this is not a money-making scheme. It is urged as a patriotic proposal. We who are interested in aviation in this country, desire to see the air service extended and build up similar to that in Europe. There the government subsidizes air companies, and guarantees them against losses. We merely ask for the mail contract and hope the administration and Congress will see the advantages of our plan."

According to Mr. Litchfield, the dirigible would leave Los Angeles on Saturdays and arrive at Honolulu on Monday morning and leave that afternoon and arrive at Los Angeles Wednesday night. This would give a thirty-six-hour service one way instead of four to six days by steamer.

Senators interested in air expansion have told Mr. Litchfield that his proposal seemed so advantageous to the government that there appeared to be no doubt that Congress would enact the necessary legislation during the regular session in December.

Approval of the plan is desired by the promoters within the next seven months so that a contract for an airship similar to the two now being built for the Navy can be let. If the hull of the proposed dirigible is the same as those building for the Navy a large amount can be saved.

The successful operation of an air service from California to Hawaii and thence to the Far East and the Philippines, under contract with the Government to carry the mails, would obviously deprive American mail steamships of an important source of income. The possibility that Congress may pass the bill to be introduced by Senator Burton next December, has apparently influenced the Dollar Steamship interests to seek co-operation with the proposed new company. The "San Francisco Examiner" on July 1, reported that negotiations were in progress between the Dollar Steamship Company and the Goodyear-Zeppelin Company for a transpacific dirigible service.

Stanley Dollar, vice president of the steamship company, was quoted as having said he had held several conferences with Goodyear-Zeppelin officials, and that while no agreement was reached negotiations were continuing.

Mr. Dollar said that if the plans materialized the first service probably would be between San Francisco and Hawaii, and if it were commercially successful other lines connecting with the Asiatic mainland would be established. Passengers, mail and light freight would be carried.

Officials of the Goodyear-Zeppelin Company when asked to make a statement concerning the negotiations with the Dollar Company said that although the project was under discussion with several important American companies, no arrangements had as yet been made. They added that the aircraft to be used on this route would be fabricated at Akron and assembled on the Pacific Coast and would be of the same size as the two dirigibles now being constructed by the company for the U. S. Navy.

Japan Moves Town to Reach Coal Vein

COAL mines as a rule are anything but attractive, and colliery towns are usually scars on the landscape. In Fushun, however, is the largest open-cut coal mine in the world. An enormous gash has been made in the face of the earth some three kilometers in length, and the even terraces which are left along the sides after the coal has been won by the stripping method present an extraordinary and, when the amber deposits streaking the coal vein catch the sun's rays, a beautiful sight.

Not only is the open-cut coal mine here the largest of its kind in the world, but the coal is probably the cheapest. The Japanese engineer in charge admits that the cost of mining is far below that of the Kailan Mining Company's mines near the Great Wall, which is $1.80 Mex. a ton.

Here, too, is perhaps the best example in Manchuria of the capacity of the Japanese to make bold decisions. Not many years ago a city of about 40,000 inhabitants was built here when the South Manchuria Railway Company took over the Fushun coal fields and started to develop them on a large scale. Rail lines, business houses, paved streets, schools, hospitals and amusement houses were built.

After all these things had been completed it was discovered that the largest coal vein in the field ran directly under the city. The coal was almost on the surface and could be mined from an open cut, so the entire city was, or rather is still, being moved to a new site three miles away.

Already the New Town, as it is called, has taken shape and promises to be the finest city in Manchuria. Three enormous hospitals, schools, offices, business houses, a new railway station and beautiful residences for the officials and miners have been erected.

There are still many buildings left in the Old Town, but the mine executives estimate that in ten years there will be no trace of the Old Town left. To-day a four-storey brick hotel stands on the edge of the immense pit and to-morrow it is gone. In two months' time the entire block in which it stood will be gone and forgotten.

The Fushun coal deposits were discovered some seven centuries ago and during the Yuan Dynasty they were worked by the Koreans. When the Manchus came into power, however, out of superstitious regard for the spirits of their departed imperial ancestors who were buried near here, the work was stopped. During the time the Russians controlled Manchuria the mines were worked by them, but the output was only about 360 tons daily. Last year the average output under the Japanese was 30,000 tons daily.

The deposits are quite compact, the total length being about ten miles and the width a mile and a half. The seams reach a maximum depth of 3,000 feet. As the vein runs westward it becomes thicker, and at the extremity is 400 feet. At present three shaft mines, five inclined shafts, one large open pit and two smaller ones are being worked. Excavations and borings have been made, and it is estimated that the entire deposit contains well over a billion tons.

The principal consumers of the coal are the South Manchuria Railway, the Anshan Iron Works, electricity and gas plants in South Manchuria and Japan, and the average sale price is 5 yen a ton f.o.b. Fushun.

The enormous open pit was started only seven years ago and is now 200 feet deep. The vein runs down 1,000 feet here, and it is estimated that in twenty-five years this depth will be reached. Steam and electric shovels are used for the stripping. Dynamite charges are used to blast the coal loose along the terraces, and the shovels are used to pick it up and dump it into the cars which run along each terrace.

Two shifts of ten hours each, with an interval of two hours between shifts, are worked.

Perhaps even more interesting than the coal mines here is the oil shale industry. Here the vital question of supplying oil for Japan's navy is being solved. A great new plant for the distillation of oil from the shale deposits here is nearing completion. The system which is to be used is something new in oil distillation. After studying systems, used in the United States and England in distilling oil shale, the Japanese engineers in the Fushun coal mines here have perfected a new and, they proudly claim, better system. The new plant, when completed, will cost Y.7,000,000 and have a capacity for treating 12,000 tons of oil shale daily.

The shale deposits lie above the coal seams and the actual tonnage runs into an enormous figure. Many estimates have been made and figures quoted, the most conservative of which is 3,500,000,000 tons. The quality of the shale varies, being very rich at the top and gradually getting poorer as the strata deepen. The average oil yield is about 6 per cent., the range being from 14 to as low as 1 per cent. If the poorest strata are discarded the average would come to about 8 per cent., which makes the distillation highly profitable.

If only the top layers of the strata are used, as they must be at first, and assuming the oil percentage at 10, this represents 1,200 tons of crude oil daily. Even with the oil percentage at 8, 1 ton of shale will produce 1½ gallons of gasoline, 4.22 gallons of kerosene, 5.58 gallons of gas and fuel oil, 1.54 gallons of lubricating oil, 20 pounds of tar and 40 pounds of sulphate of ammonia.

So favorable are the conditions, low cost of labor, fuel and excavation, and the abundant deposits, that oil shale can be worked at a very large profit. The shale within the area of the great open cut alone will supply 2½ times the amount of crude oil produced from all the oil wells in Japan for thirty years, and the entire deposits more than the Japanese wells for 500 years.

A very remarkable thing about the coal deposits is the enormous amount of amber in the coal strata. As much as three tons of large blocks are picked up daily, and several hundred pounds of smaller pieces are not even gathered. Most of it, however, has particles of coal in it which cannot be entirely eradicated and thus renders its market value very low. It is believed that a huge forest of sequoia trees was the foundation of the coal field. Many pieces of amber have been found in which perfectly fossilized leaves are embedded.

If some method of separating the impurities from the amber can be found amber varnish can be manufactured on a large scale. The Central Laboratory of the South Manchuria Railway in Dairen has worked on the problem for several years, but without success.

The total number of employees working in the mines is 60,000. Of these 3,000 are Japanese and the remainder Chinese. The city and colliery district combined has a population of about 90,000, of whom some 70,000 are Chinese, 15,000 Japanese and the rest Koreans and Russians.

The medical, educational and social features of this thriving little city are interesting. The hospitals are strikingly handsome buildings and their equipment and staffs are capable of handling any case. A mutual relief association has been formed by the mining company to which each man donates one day's pay monthly, the company matching the total subscriptions. Co-operative stores have been established where the miners can buy goods at cost. Libraries, clubs, employees' associations and athletic clubs have been formed and are well patronized.

Each laborer is supplied with free quarters, fuel, electric light, water, bath and a hair-cut. His only outlay is for food and clothes. Food is supplied under the management of the company, and the average cost is 11 sen a day for each person. The average daily pay of the miners is 70 sen.

The Asano Prize

Dr. Niwa Honored by Japanese Scientists

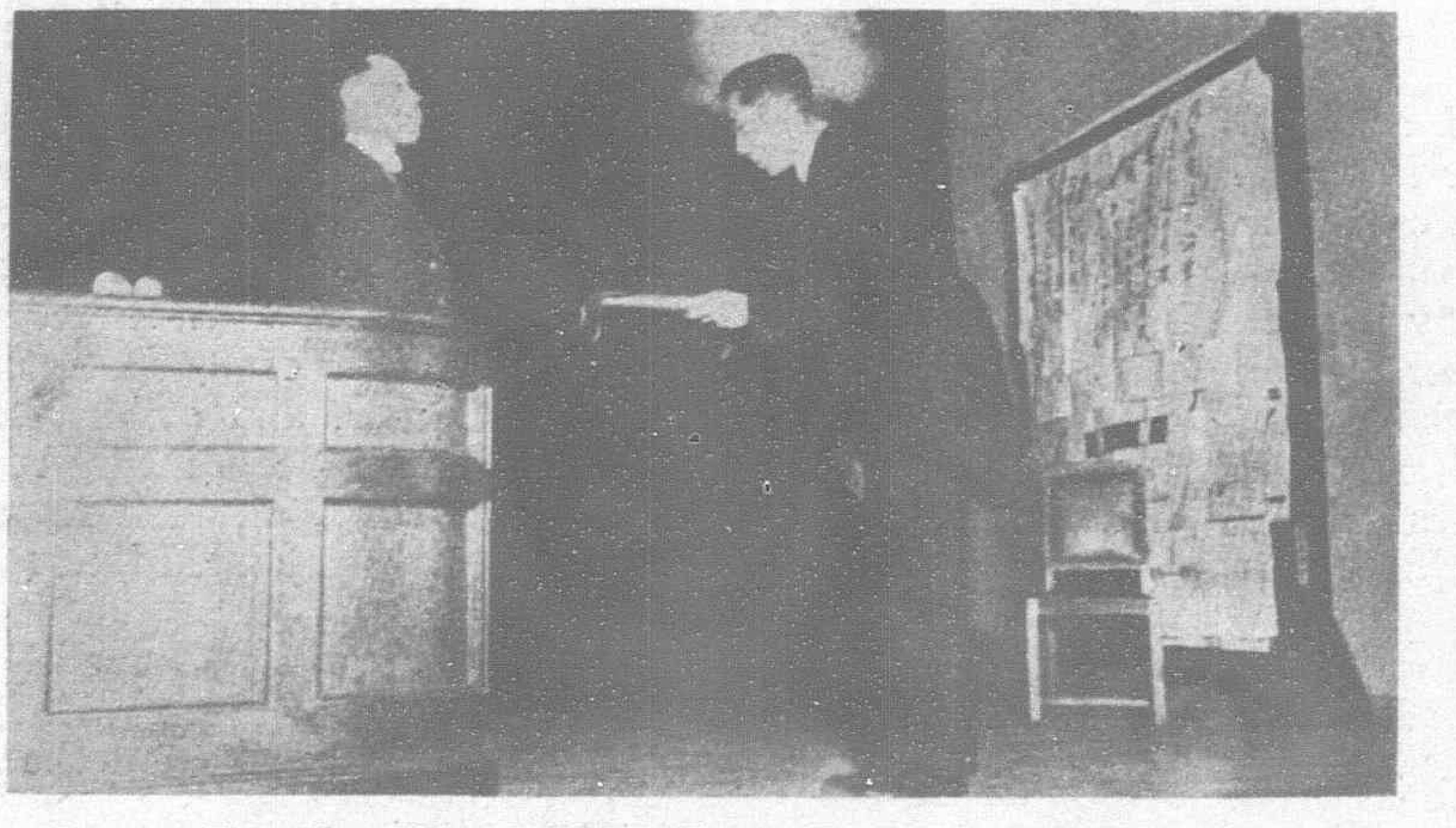
PREEMINENT in the field of electrical engineering is Dr. Yasujiro Niwa, Chief Engineer of the Nippon Electric Company, Ltd., of Tokyo, Japan. Recently Dr. Niwa was signally honored by the Institute of Electrical Engineers of Japan, which, at its annual meeting on January 26, 1929, awarded him the Asano prize for distinguished contribution to electrical engineering.

The Asano prize was established by associates and friends of Dr. Asano, one on the pioneers of electrical engineering in Japan and the award is made for "meritorious achievement in electrical science, electrical engineering, and electrical invention." It is the Japanese Institute's only method of appreciation, corresponding in importance to the Edison medal of the American Institute of Electrical Engineers. In addition to the high honor indicated by the notification certificate, a facsimile and translation of which appear on this page, the award carries with it a cash honorarium of one thousand yen.

The recipient of the prize is chosen by the Asano prize committee which consists of twenty foremost members of the Institute. The distinction has been three times awarded in the past. The first to be so honored was Dr. H. Nagaoka, professor at the Imperial University of Tokyo, who was selected in recognition of his meritorious works in electrical science, especially in the theoretical and experimental verification of transmutation of mercury into gold. Dr. H. Ho, professor at the Imperial University of Tokyo, author of the famous book, *Electrical Lightning and Surges*, and of extensive researches on high voltage problems, was a second recipient. In recognition of his works on high power transmission problems, especially theoretical study of three-phase transmission line, Dr. S. Bekku was the third to win the honor.

The picture reproduced on this page is a specimen of those sent over the apparatus developed by Dr. Niwa in the laboratories of the Nippon Electric Company, Ltd. The award was conferred upon Dr. Niwa this year largely on account of his work on this picture transmission system and with due acknowledgement of his other important previous work, notably in originating a method of computing the self-inductance of the polygonal solenoid and in the invention of a new permeameter.

The distinction thus accorded to Dr. Niwa places his name among those of the most distinguished engineers of Japan. It is a fitting tribute to a scientist of rare ability and outstanding achievement.



Doctor Yasujiro Niwa, Chief Engineer of the Nippon Electric Company, Ltd., Receiving Asano Medal

South Manchuria Railway

[From the " Report on Progress in Manchuria 1907-1928," published by the South Manchuria Railway]

THE South Manchuria Railway is more than a railway company. In addition to the extensive railway undertakings in South Manchuria which constitute the main business, it conducts, as accessory enterprises, coal mines, iron works, wharves, warehousing, etc. The Company also conducts educational hygienic and other public works within the Railway Zone ; controls a number of joint-stock companies, electric and gas works, shipping and dockyard companies, hotel undertakings, etc., chiefly in South Manchuria, and acts also as a holding company for these concerns. The functions of the corporation and the volume of its business are possibly the largest of their kind in the Orient, and in some respects, are unsurpassed by any other concern in the Pacific area. The story of its development is also, to a great extent, the story of the progress of Manchuria in the last twenty-one years, for both are inseparably related.

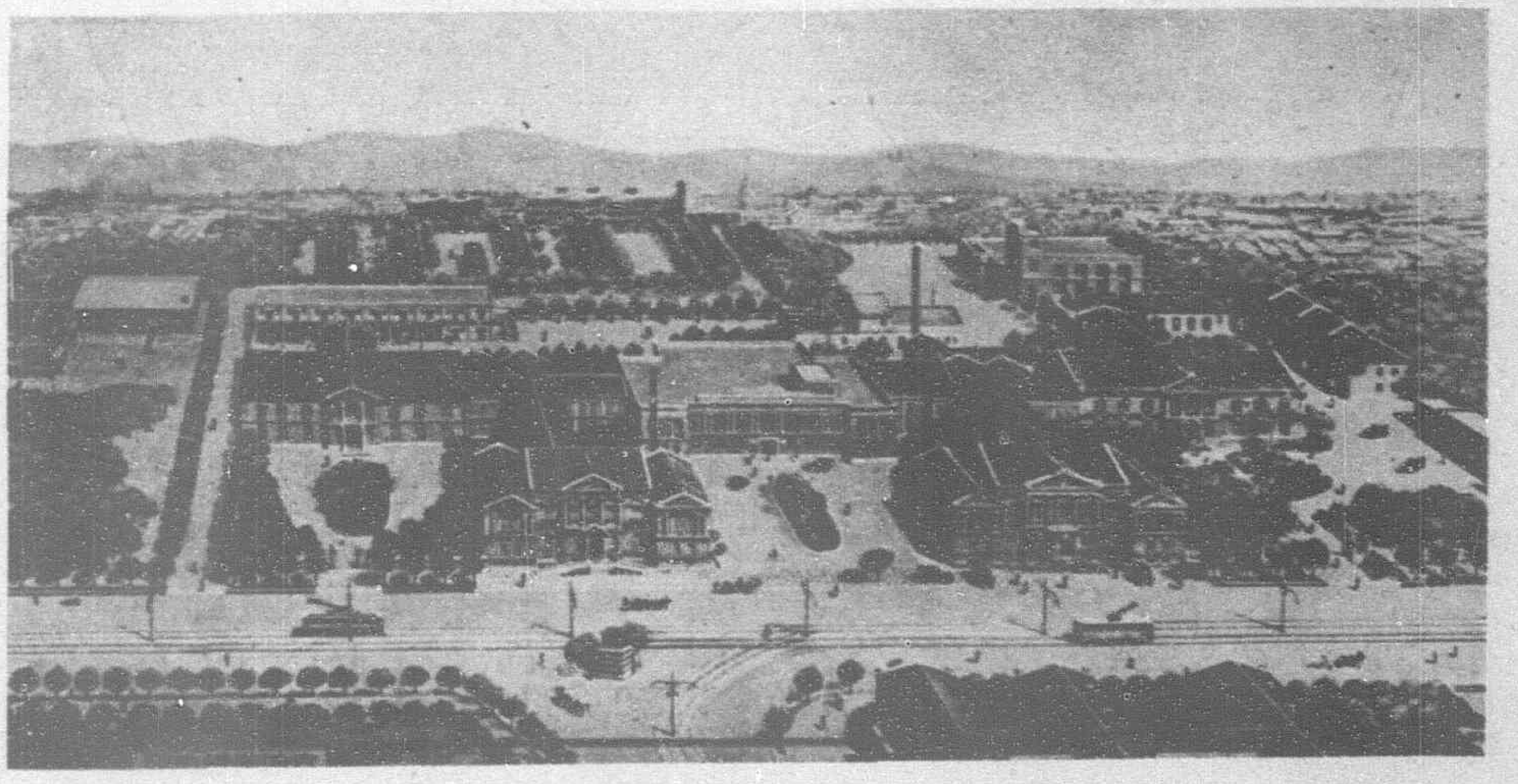
Formation of the Corporation

The Japanese Government engaged in most serious considerations prior to the establishment of the Company. In contrast to the political or military line first built by the Russians in Manchuria, it was decided that the railways to be conducted by Japan should rather be commercial in order to serve international trade and facilitate the development of industry and agriculture in Manchuria. Whether the railway should be conducted directly by the Government, as in Japan proper, or by a joint-stock corporation was another question. The capital of the undertaking had to be adequate, otherwise efficiency of operation and international service might not be obtained. Above all, the most important consideration was that the principal business of the Company was to be operated and conducted in a foreign land.

As stated in a previous chapter, when the *post-bellum* program was submitted to the Council of Cabinet Ministers and Elder Statesmen in May, 1906, it was held that the Japanese policy adopted in Manchuria should respect China's sovereignty and should adhere to the principle of equal opportunity for all nations.

The Imperial Ordinance sanctioning the organization of the South Manchuria Railway Company was promulgated on June 7, 1906. The ordinance provided, (1) that a joint stock corporation, called the Minami Manshu Tetsudo Kabushiki Kaisha (South Manchuria Railway Joint Stock Company) should be organized for the purpose of engaging in railway traffic in Manchuria ; (2) that the shares of the Company should be registered and owned only by the Japanese and Chinese Governments or by their nationals ; (3) that the Japanese Government may offer as a part of the capital its Manchuria railways, coal mines and appurtenances obtained in 1905 from Russia by the Treaty of Portsmouth and approved by China in virtue of the Peking Treaty concluded in the same year ; (4) that the President and Vice-President should be appointed by the Government, and the directors appointed from among the shareholders, but that the directors should be elected at the General Meeting of the shareholders ; (5) that to matters relating to the Company not provided for by this ordinance the provisions of commercial law should be applied. On the 13th of July, the organization committee of eighty persons, including higher officials in several Government departments, leading members of the Diet, University professors, and eminent businessmen of the Empire, was organized. General Kodama, who served as Chief of the General Staff to Field Marshal Oyama in the war with Russia, was appointed chairman, and on his death Viscount Terauchi, who was War Minister at the time, succeeded him. On August 1st, an order setting forth the conditions of the formation of the Company was given to the committee by the Ministers of Foreign Affairs, Communications, and Finance conjointly.

These conditions provided, (1) that the railway tracks should be changed to 4 feet 8½ inches (standard) gauge within three years from the day when the Company should commence operations ; (2) that on the Dairen-Changchun trunk line, the tracks between Dairen and Suchiatun (near Mukden) should be doubled ; (3) that the necessary arrangements for connecting land and sea where harbors or bays were approached by the railways should be provided ; (4) that business functions be provided, mainly in connection with railway enterprises and accessory undertakings—coal-mine operation, water transportation, warehousing, electric enterprises, etc. ; (5) that furthermore the Company should carry out public works, education and sanitation in the Railway Zone with Government permission ; (6) that a Government guarantee would be provided for the payment of interest on debentures and for the repayment of principal. It was also provided that when the dividend of the Company for any business year should be less than 6 per cent. on the paid-up capital, the Government should make up the deficiency for the period of fifteen years. Acting on the above-described Imperial Ordinance and Government order, the committee finally, on the 14th of August, drew up the articles of incorporation of the South Manchuria Railway Joint Stock Company, observing in many respects the provisions of the commercial law of Japan, and the articles of incorporation of the Company obtained the Government's approval on the 18th. When the general meeting of shareholders for the establishment of the Company was held on November 22nd, the articles of incorporation were unanimously passed. Thus the South Manchuria Railway Company came into existence by a special charter of the Government, but essentially as a joint-stock company organized in conformity with the provisions of the commercial law of Japan. When Baron Goto (now Count) was recommended at the general meeting as the President of the newly-established corporation, the President spoke on the mission of the South Manchuria Railway. He declared that though the total length of the railways to be operated by the Company was a little less than 700 miles, their position constituted a link in world communication and provided international business facilities, not only for the Orient but also for the world at large. The policy of the Company should be in conformity with the will of the Government and the shareholders, but should give the greater weight to the general wishes of business men at home and abroad. More particularly should a spirit of co-operation with the Chinese authorities and people be cultivated.



A Bird's-eye View of the Head Offices of the South Manchuria Railway Company, Dairen

Organization

Most serious attention was paid to the selection of the personnel of the governing board of the Company. Baron Goto, who had exhibited organizing and executive ability in civil administration and industrial undertakings in Formosa, having been appointed President, the directors of the Board were selected from among persons having ability and experience in banking, trading and railway operation, in the legal profession, and in civil administration. Baron Goto's service, though it was of short duration, being rather less than two years, placed the Company on a sound basis. The terms of office of the President and Vice-President were fixed at five years, and of Directors at four years; but it is a matter of regret that political changes in Japan have often compelled a change in the presidency of the Company, so that nine Presidents have functioned during the last 21 years. Yet during these years the Company has made great progress. Its investments have grown to Y.644,800,000 from Y.101,800,000, and its annual profit to Y.36,274,000 from Y.2,017,000.

The present President, Mr. Jotaro Yamamoto, and the Vice-President, Mr. Yosuke Matsuoka, were appointed on July 19, 1927. Presdient Yamamoto is a business man well known in Japan for high executive ability; Vice-President Matsuoka spent many years in the diplomatic service, and joined the Company as Managing Director in 1921, serving in this office until 1926.

It is the policy of the new President to place the Company's business on a more sound economic basis, and to take progressive steps to develop enterprises which will afford benefit to Japan and equally to China. In a speech made at the shareholders' general meeting held on June 20, 1928, he stated that Manchuria and Mongolia contain a vast territory still to be opened up, where many natural resources await a market. The extraordinary migration of Chinese to Manchuria and Mongolia, annually numbering over one million people, is one of the important factors entering into the development of these regions. In the economic relation of Japan with Manchuria, Japan's primary consideration lies in receiving from Manchuria foodstuffs and industrial materials, while fostering the export of Japanese manufactures to China, which is a great customer for Japanese goods. The South Manchuria Railway, he declared, is naturally charged with the mission to carry out this national policy and to function as an instrument for its execution. As the first step, it was decided that the Fushun shale oil industry project, which had been pending for several years, should be carried into effect so as to ensure the production of 55,000 tons of heavy oil a year. By installing one more blast furnace, with a capacity of 500 tons, at the Anshan Iron Works, its annual output is to be increased to 200,000 tons from 150,000 tons. Following the policy of placing the Company's business on a more sound economic basis, by readjusting the extensive organization and by eliminating supernumeraries, expenses were cut down, while equipment and efficiency were improved. The result was that the Company's net profit for the fiscal year ending March 31, 1928, increased to Y.36,270,000, *i.e.*, an increase of Y.2,120,000 over that of the preceding fiscal year.

Count TERAUCHI, Succeeded as Chairman after Death of Count Kodama

Count KODAMA, Chairman of the Organizing Committee of the S. M. R.

Count GOTO, First President of the S. M. R.

Mr. YOSUKE MATSUOKA, Present Vice-President of the S. M. R.

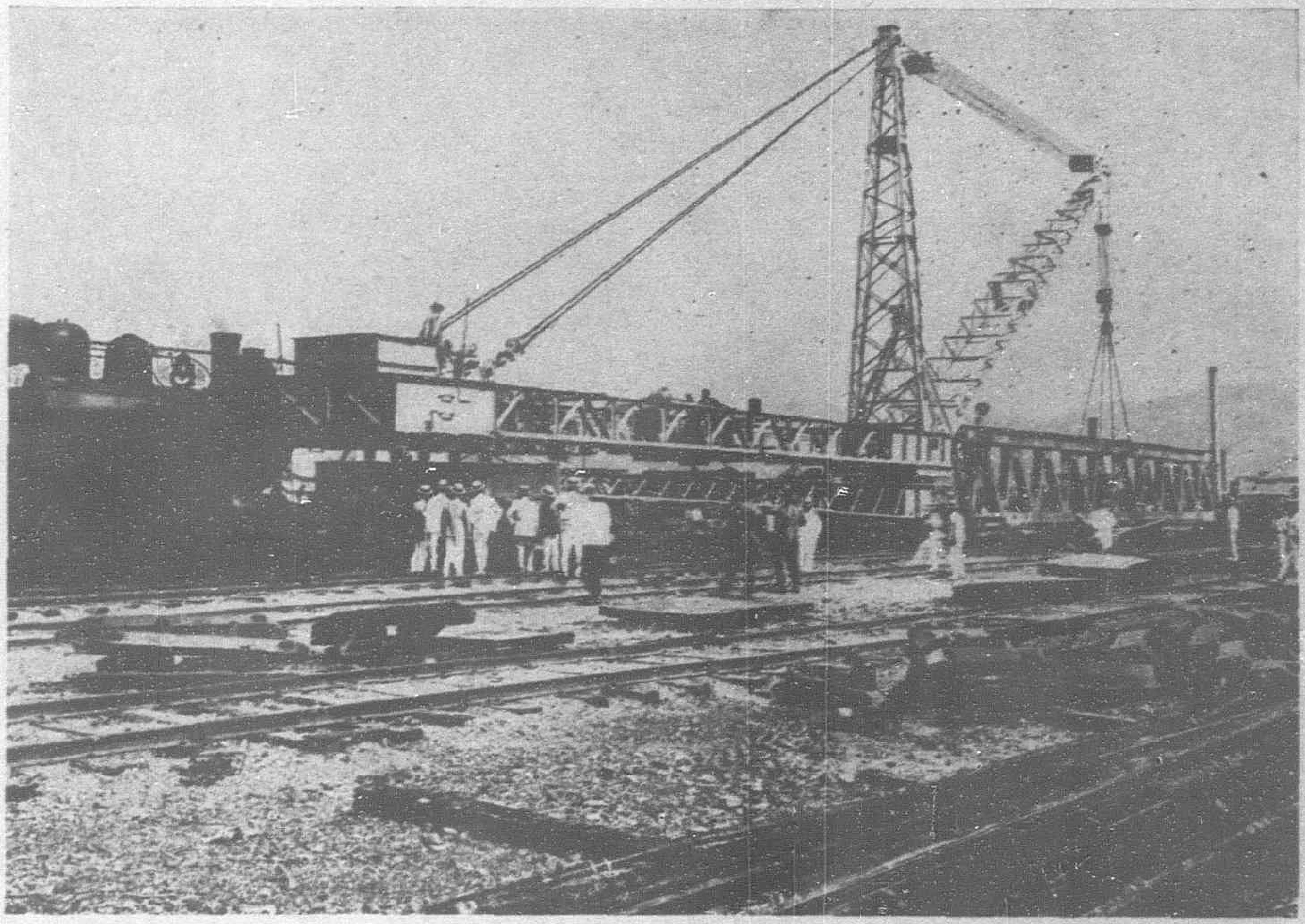
Mr. JOTARO YAMAMOTO, Present President of the S. M. R.

When the Company commenced operations in April, 1907, its organization was divided into five departments; General Affairs, Research, Transportation, Mining, and Local Affairs. The directors, though constituting the board of administration, had also to act as departmental chiefs, but in the course of years the administration underwent various changes, until in April, 1923, the organization as it at present exists was evolved. In addition to the President's Secretariat, there are five departments, General Affairs, Railways, Industries, Local Affairs, and Treasury. Affiliated offices are the Tokyo Branch Office, Fushun Coal Mining Office, Anshan Iron Mining Office, Technical Committee, etc. As the functions and volume of business are steadily increasing, the directors have ceased to perform the duties of departmental chiefs, but attend jointly to the supervision of important business under the control of the President, besides acting as a board of directors, leaving departmental business to the general managers who act as department chiefs.

At the close of the fiscal year ending March 31, 1908, the Company employed 2,967 officials, and 6,135 Japanese and 4,129 Chinese workers, totaling 13,231. After twenty-one years, *i.e.*, on March 31, 1928, the official staff had increased to 8,832, the Japanese workers to 11,865, and the Chinese to 13,677, totaling 34,374. In addition, the coolie day laborers who are nearly all Chinese, increased from 30,000 enrolled per day to 70,000.

Finance and Accounting

The authorized capital of the Company was originally Y.200,000,000, of which Y.100,000.000 was furnished by the Japanese Government turning over all its property in railways and coal mines and their appurtenances to the Company. The other half was offered for subscription to the Chinese Government and the Japanese and Chinese public, but this offer was not accepted on the part of the Chinese. When the first issue of shares was floated in September, 1906, the Japanese general public over-subscribed the issue no less than 1,066 times. Up to March, 1920, Y.80,000,000 was paid up, leaving Y.20,000,000 uncalled, but with the necessary development of the Company's activities, especially after the Great War, the Company increased its capitalization from Y.200,000,000 to Y.440,000,000. The Government again increased its holdings, by Y.120,000,000, or half of the increased capital, by taking over three debenture issues which the Company had floated on the London Market: £4,000,000 of five per cent., £2,000,000 of five per cent., and £6,000,000 of four and one-half per cent., totaling £12,000,000. The actual net receipts were £12,000,000, being Y.117,156,000 in Japanese currency, while of the Government holding Y.2,844,000 was left unpaid. Of the remaining shares, amounting to Y.220,000,000 allotted to the general public, Y.138,000,000 have been subscribed, and Y.82,000,000 remain uncalled, as on March 31, 1928.



45-ton Capacity Special Steam Crane for Railway Bridge Girder Work for South Manchuria Railway

The Company was originally authorized to issue debentures to the amount of the unpaid share capital belonging to other than Government holders. By Imperial Ordinance No. 4 of 1910, this amount could be expanded to twice the amount of all paid-up share capital, but could not exceed the amount of the authorized capital. The Government may guarantee the payment of interest and principal of the debentures to the same extent, if necessary, but debentures issued with the Government guarantee must be redeemed within twenty-five years.

The financial policy of the Company in the first stage was to raise funds for its undertakings more by issuing debentures than by floating new capital shares. Finding the most favorable market in London, four issues of debentures, aggregating £14,000,000, were floated there in succession during the four years ending January 3, 1911. Of these debentures, £12,000,000 were, as previously stated, taken over by the Government in payment for its holdings of share capital, and the remaining £2,000,000 were redeemed on July 1, 1911. Since then, more than twenty-two issues of debentures were made in Japan up to May 31, 1928, except one amounting to £4,000,000 which was issued on the London market on July 19, 1923. Nine out of these twenty-two issues had been redeemed up to the end of the business year on March 31, 1928, leaving fourteen issues outstanding, aggregating Y.278,152,000.

The Company started its undertakings in 1907 with an estimated fund of Y.100,000,000, of which Y.80,000,000 was raised by floating bonds in England and Y.20,000,000 by calls on shares.

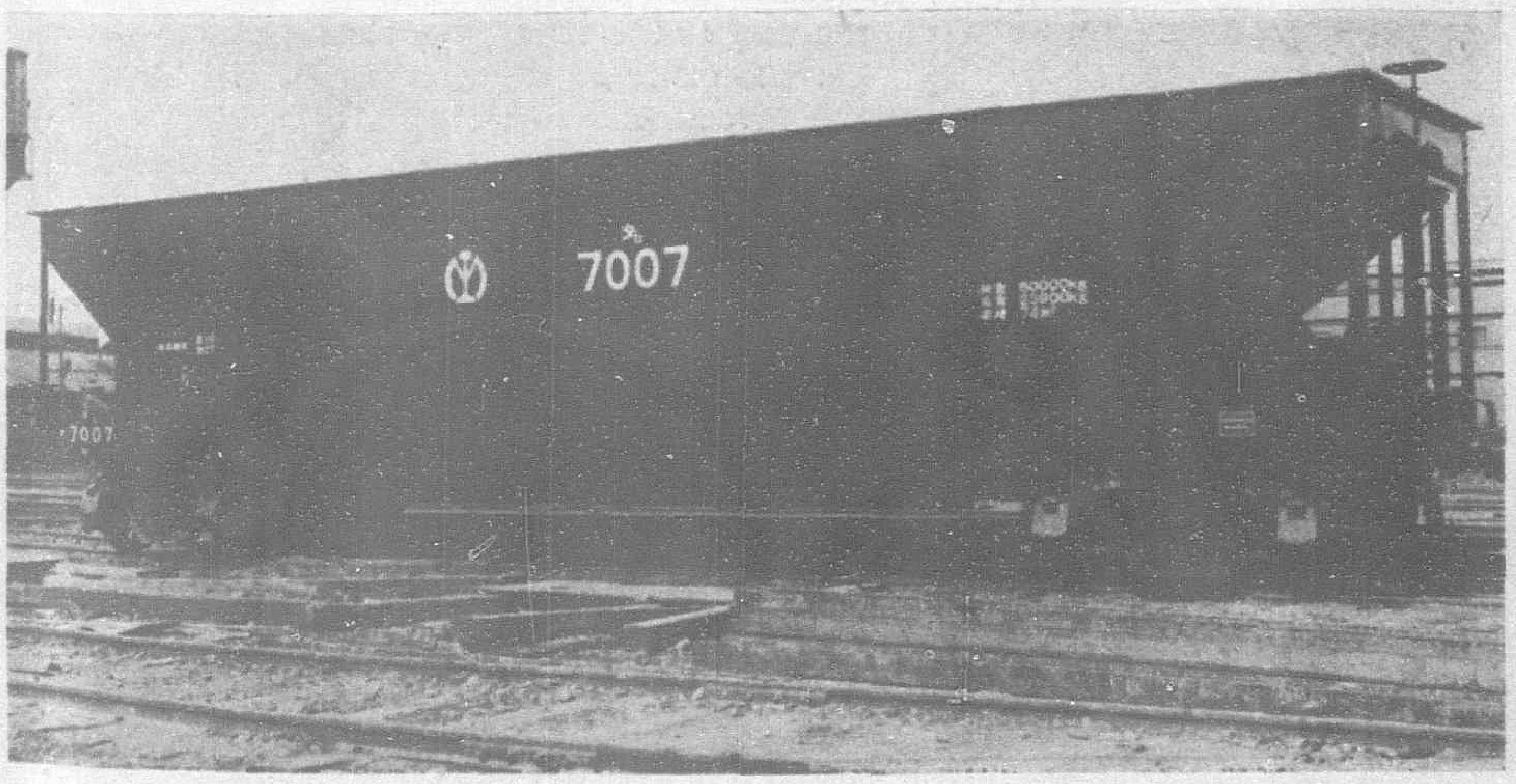
The fund thus raised by the means mentioned above have been invested in various enterprises. During the last twenty-one years, ending March 31, 1928, the investment in direct undertakings, including the appraised value of properties taken over by the Company from the Japanese Government in 1906, aggregated Y.644,841,734, as shown by the table below :

	1907-8	1912-3	1917-8	1922-3	1927-8
Railways ...	34,542,910	97,113,296	105,530,752	189,616,304	239,517,926
Workshops ...	763,906	6,048,094	7,569,359	11,068,325	8,759,631
Steamships ...	—	3,385,357	2,680,317	3,559,874	4,044,933
Harbors ...	6,640,837	14,779,320	24,099,384	37,064,308	59,789,109
Coal Mines ...	46,396,043	56,469,164	71,097,985	121,056,784	102,730,711
Iron Works ...	—	—	4,447,760	34,541,803	20,747,607
Electricity ...	474,695	5,002,052	5,738,182	15,237,405	—
Gas	3,592	1,170,495	1,554,778	5,434,140	—
Hotels ...	216,302	1,342,106	2,075,006	2,370,222	—
Public Works	3,374,494	11,022,573	17,786,171	40,863,288	164,679,343
Others ...	9,459,178	18,544,224	21,782,973	46,074,005	44,572,475
Total ...	101,871,957	214,876,681	264,362,667	506,886,458	644,841,735

The growth of these enterprises is shown by the following table of receipts, expenditures, and net profits :

Fiscal year	Receipts	Expenditures	Profits	Percentage of expenditure against receipts
1907-8...	... Y.12,543,116	Y.10,526,531	Y.2,016,585	84
1912-3...	... 33,546,477	28,620,433	4,926,045	85
1917-8...	... 69,429,252	54,503,610	14,925,643	79
1922-3...	... 169,956,646	134,876,402	35,080,244	79
1927-8...	... 230,558,523	194,284,201	36,274,323	84

The net profit of the Company for the year 1907 was Y.2,000,000 ; it had increased to Y.36,000,000 twenty-one years later. The railways furnish the most important item of profit, the total amounting to Y.68,000,000 to-day, surpassing by far the net profit of the Company. Next to the railways, the coal mines yield about Y.9,700,000 profit, and harbor undertakings about Y.970,000. Other enterprises of the Company to date are conducted at a loss, or a nominal profit, but are designed for the public benefit and to develop traffic for the railway. The expenditures for local public works such as schools, hospitals, street and road-building, industrial and agricultural model farms, etc., were more than Y.19,000,000, and the receipts less than Y.6,000,000. The hotel undertakings were losing more than Y.264,000 a year, and Anshan Iron Works Y.157,000 a year. The following table shows the profit and loss account of the Company for the fiscal year ending March 31, 1928.



60-ton Capacity All Steel Coal Cars for South Manchuria Railway

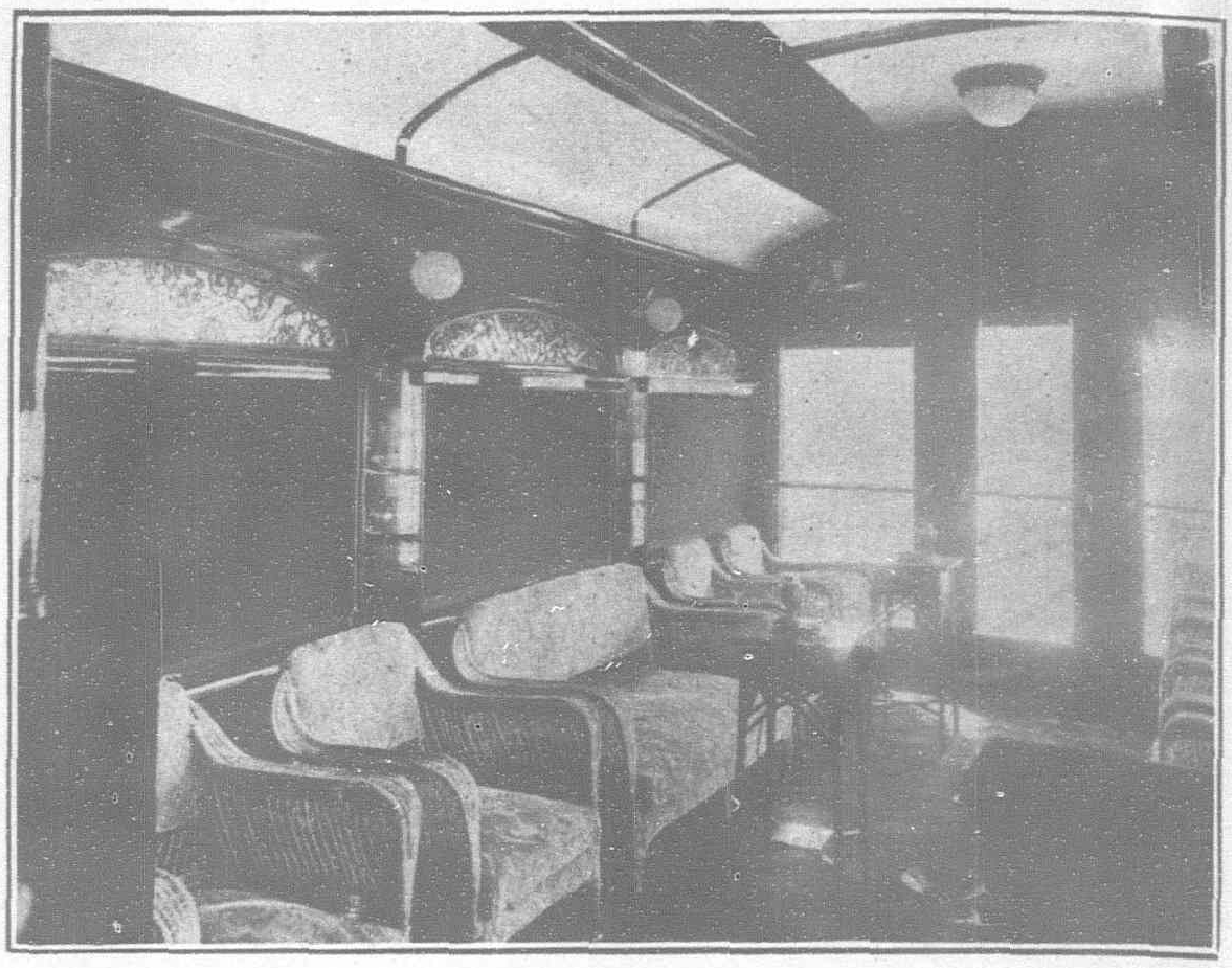
	Receipts	Expenditures	Profit and Loss
Railways	113,244,180.15	45,235,834.93	68,008,345.22
Harbors	10,275,942.58	9,305,782.43	970,170.15
Coal Mines	82,787,419.09	73,039,118.77	9,748,300.32
Iron Works...	9,223,114.00	9,380,656.31	— 157,542.31
Hotels	1,000,859.52	1,264,943.69	— 264,084.17
Local Public Works ...	6,098,233.67	19,104,444.35	—13,006,210.68
Interest on Deposits and Loans	5,445,735.56	20,567,502.88	—15,121,767.32
Sundry Profit and Loss ...	2,483,039.34	2,839,438.77	— 356,399.43
Overhead Charges ...	—	11,482,935.73	—11,482,935.73
Depreciation Fund for Debentures	—	2,063,542.97	— 2,063,542.97
Total	230,558,523.91	194,284,200.83	36,274,323.08

In the matter of dividends on the net profit of the Company, the Japanese Government guaranteed payment up to 6 per cent. on the publicly held shares, if the dividend should fall below that percentage; but the Company's enterprises, especially the railways, were so successful that a 6 per cent. dividend on the publicly held shares was paid from the first fiscal year, and was gradually increased to 10 per cent. The Government shares in the profit, but only after payment has been made of all charges and of the 6 per cent. dividend on the public shares. The Government received such dividends from the fiscal year 1909, and has received 4.3 per cent. on its holding since 1921.

Appended is the General Balance Sheet—Assets and Liabilities at the end of the Fiscal Year, March 31, 1928, and the disposal of Profits.

ASSETS.

Capital Stock uncalled	Y.84,844,000.00
Fixed Investment	644,841,734.32
Merchandise	4,787,214.55
Stores and Supplies	7,450,956.25
Bonds and Shares	55,287,181.24
Cash on Hand	240,204.72
Deposits	40,490,222.96
Loans	59,452,855.32
Securities Received in Pledge	5,577,794.52
Due from other Concerns	997,409.82
Guarantee Fund	894,932.20
Bills receivable	5,798,421.51
Miscellaneous Accounts receivable	56,848,639.66
Miscellaneous Accounts paid in advance	13,728,372.07
Unadjusted Balance in Engineering and Workshop Accounts	728,969.27
Discounts on Bonds and Charges	12,970,972.68
Exchange Accounts	9,095.99
Total Assets	994,948,976.08



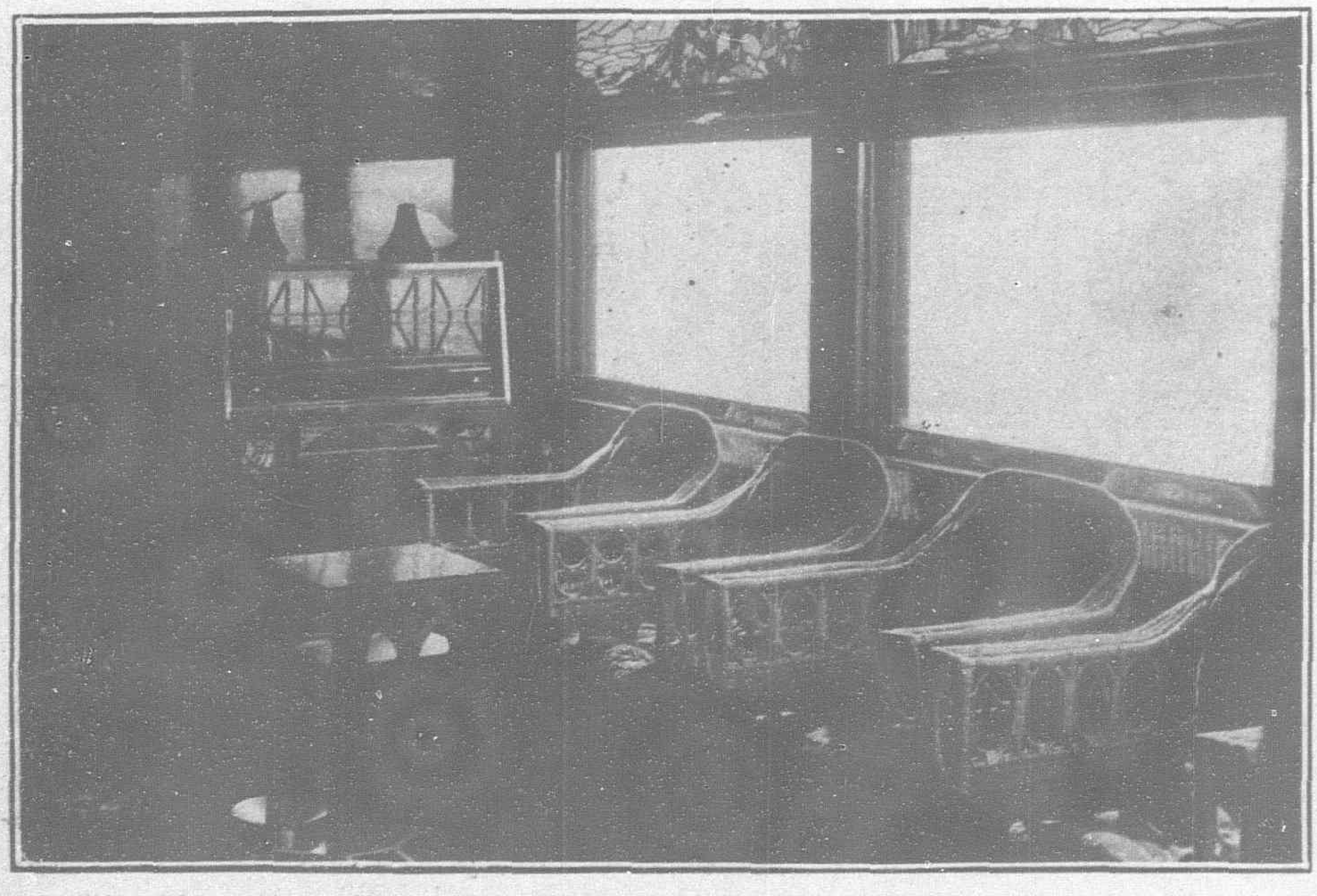
Interior of Observation Car for the S.M.R. Built at the Shakako Works

LIABILITIES.

Capital Stock authorized	Y.440,000,000.00
Legal Reserve	17,463,903.38
Special Reserve	127,400,000.00
Bills payable	3,700,000.00
Retirement Allowance Fund for Employees... ...	2,500,000.00
Debentures	Y.278,152,000.00
Due to other Concerns	1,217,131.28
Securities given in Pledge	882,000.00
Guarantee Fund	3,210,429.01
Exchange Accounts	53,279.82
Savings Deposits of Employees	7,771,566.99
Guarantee Deposits of Employees	27,507,530.61
Mutual Relief Society Fund	4,331,057.51
Miscellaneous Accounts payable	23,371,630.93
Matured Bonds unpaid	769,700.00
Miscellaneous Accounts received in advance ...	11,548,586.44
Balance brought from previous Term	8,795,837.03
Net Profit	36,274,323.08
Total Liabilities	994,948,976.08
Net profit for the Year ended March 31, 1928 ...	36,274,323.08
Balance brought from previous Term	8,795,837.03
Total	45,070,160.11

DISPOSAL OF PROFITS.

Legal Reserve	Y.2,836,096.62
Dividends on Government Stock	9,337,708.00
Dividends to Shareholders other than Government (6% per annum)	7,740,000.00
Supplementary Dividends to Shareholders (4% per annum)	5,160,000.00
Special Reserve	8,000,000.00
Retirement Allowance Fund for Employees... ...	2,000,000.00
Bonuses to Officials	500,000.00
Balance carried forward ...	9,496,355.49
Total	45,070,160.11



An Observation Car is Part of the Equipment on S.M.R. Express Trains

For the past twenty-one years, the special reserve and the legal reserve were gradually increased, and aggregated about Y.150,000,000 at the end of the fiscal year closing March 31, 1928. On the other hand, more than Y.100,000,000 in the investment account have been written off in the same period in respect of depreciation of the Company's properties. It will thus be seen that the financial standing of the Company is on a sound basis.

Railways

The South Manchuria Railway Company to-day owns and operates railway lines totaling 690.8 miles, in which the sum of Y.239,517,926 was invested up to the end of the fiscal year ending March 31, 1928. The gross revenue for the year was Y.113,244,180 expenditure Y.45,235,835, and profits Y.68,008,345, or Y.98,449 per mile. These figures reveal the fact that in efficiency and earning capacity the S.M.R. probably surpasses the leading railways in America, Europe, or Japan.

But, owing to the heavy investment in capital stock in the form of debentures and the various services for sanitation, education, and other public works, the profits of the Company as a whole are considerably diminished by the payment of interest and by the expense of these services.

Reconstruction and Improvement

The railway system that the Company first took over from the Japanese Government, in April, 1907, was in rather a depleted state. During the Russo-Japanese war, most of the rolling stock was withdrawn by the Russians, or destroyed on their retreat, and the bridges were blown up. With the march of the Japanese armies to the north, the track was changed from the five-feet Russian gauge to the narrow gauge used by the railways in Japan, so that Japanese rolling stock might be the more readily utilized in the Manchurian campaign. Before the Company came into existence, however, the standard gauge of 4.8½ feet had been already adopted in Korea and China. In order to serve international trade on the Asiatic continent more efficiently, the South Manchuria Railway Company promptly adopted the standard gauge and the double track as ordered by the Government.

By adopting the standard gauge, it was also observed that the reconstruction work might be quickly carried out without much interruption of traffic if American rails and rolling stock were imported.

Immediately after the railways were transferred from Government control on April 1, 1907, a comprehensive program of reconstruction was begun. The work of widening the gauge on the branch line, Dairen-Port Arthur (31.6 miles) was completed by December 1, 1907 ; on the main line, Dairen-Changchun, through Mukden (438.5 miles), by April 30, 1908, and on two other branch lines, respectively to Yingkou and Fushun Mine, by May 30. The doubling of the track between Dairen and Suchiatun, a distance of 238⅓ miles, was begun at the same time, and was completed on October 27, 1909. The doubling of the track between Suchiatun and Mukden, a distance of ten miles begun in June, 1915, was completed in November, 1918. The doubling of the track further north, from Mukden to Changchun, was begun in 1919, and is now nearly completed. The original Russian 65-lb. rails were first replaced with 80-lb. and, later, with 100-lb. rails. The roadbed being constantly improved, the steepest grade in the trunk line between Dairen and Changchun is now only one per cent., while the shortest radius of any curve is 15 chains.

The line between Antung and Mukden was originally built as a light military railway by the Japanese during the Russo-Japanese war. As already stated, Japan obtained from China the right to reconstruct the railway on standard gauge and operate and maintain the same for the purpose of international trade and industry. When this railway was transferred to the charge of the Company, it was decided to substitute the standard gauge within three years. But, owing to the controversy which arose on the subject between China and Japan, and to the line traversing mountainous regions, the reconstruction work was delayed until August 7, 1909, when the tunneling work at Fuchinling was begun. The whole work, including 24 tunnels, 205 bridges, and 213 culverts, was completed in two years and three months, and on November 1, 1911, the opening of this 161-mile railway was held with appropriate ceremony. The reconstruction cost amounted to about Y.25,000,000. This line is still a single track and 80-lb. rails were used, but these are now being replaced by 100-lb. rails.

The lines owned and operated by the South Manchuria Railway Company are as follows :—

1.	Dairen-Changchun Main Line	438.5 miles
2.	Antung-Mukden Main Line	161.7 „
3.	Port Arthur Branch line from Choushuitzu ...	31.6 „
4.	Yingkou Branch line from Tashihchiao	13.9 „
5.	Yentai Colliery Branch line	9.7 „
6.	Fushun Branch line from Hunho	35.4 „
	Total	690.8 miles

Rolling stock has been increased more than three times during the past twenty-one years, as shown in the accompanying table :

	Fiscal Year ending March 31, 1908	Fiscal Year ending March 31, 1928
Locomotives	202	441
Passenger Cars ...	104	486
Freight Cars	2,181	7,260
Total	2,487	8,183

Traffic and Operation Regulations

Regarding traffic and operation regulations, those controling the administration of the Government Railways in Japan proper were first applied to the South Manchuria Railway. In order to meet the different conditions existing in Manchuria, as well as to make these lines more effective as an important link in world communications, the Company enacted its own Traffic Regulations in October, 1909. By these Regulations, the Company's responsibilities towards both passengers and shippers of goods are more clearly defined, and greater facilities provided, while the operation of the lines was developed into a smoothly working system. However, many changing conditions, specially during and after the great European war, necessitated the revision of these regulations in October, 1927, by which greater traffic efficiency and unity in operation have been secured.

Railway Rates

The rates for passengers at present are : first class, 7 sen per mile ; second class, 4½ sen ; third class, 2½ sen. For travel on the express trains, composed of excellently equipped Pullman sleeping and dining cars, an extra express ticket is required, at the rate Y.3 for first class, Y.2 for second class and Y.1 for third class for distances up to 500 miles. Special reductions in rates, however, are made from time to time to encourage local development and assist in relief work. During the North China famine in 1920, a 50 per cent. reduction in freight rates on supplies moving into the famine district was made, while thousands of Chinese famine refugees were transported free of charge. As already stated in the section on Immigration, for the refugee immigrants driven out during 1926-7 from Shantung and Chihli provinces by the civil war, a 35 to 40 per cent. deduction was made, while infants under the age of 15 and aged persons above 60 were carried free.

International through Traffic

International through routes for passengers and freight have been gradually established in co-operation with the various railways and sea lines to Chinese and Japanese ports and inland cities, and to Europe and America. Supplementing international traffic being an important undertaking, the Company made constant efforts to this end, particularly in co-operation with Russia. When Baron Goto, the first President of the Company, went in May, 1908, to Petrograd, he made preliminary arrangements with Mr. Wentzel, Vice-President of Chinese Eastern Railway for direct through traffic between the South Manchuria Railway and the Chinese Eastern Railway. In October, the Company inaugurated an express service between Dairen and Changchun, consisting of sleeping and dining cars of Pullman type, and connecting at Changchun with the Trans-Siberian trains of the International Sleeping Car and Express Train Co. and the Russian State Express. At Dairen an efficient steamship service operated between Dairen and Shanghai ; and another service was arranged between Dairen and Japan. By the rebuilding of the line from Mukden to Antung, and the opening of the great bridge across the Yalu in 1911, thus connecting the Manchuria and Chosen lines, which connect with the Imperial Government Railways of Japan through the channel steamer service between Fusan and Shimonoseki, a new world highway system between Japan and Europe was established. In January, 1913, more detailed arrangements for through traffic service of freight were made at Petrograd between the Japanese Government Railways, Korean Government Railways, South Manchuria Railways, Osaka Steamship Company, Chinese Eastern Railway of Russia, and Russian Volunteer Fleet. There was also a through traffic arrangement for tourists between the Far East and Europe, going *via* Trans-Siberian Railways and returning *via* Suez Canal, or *vice versa*. In this round trip, the North German Lloyd, the Peninsular and Oriental Steam Navigation Co., and the Messageries Maritimes participated. Round-the-world through traffic was also arranged by the participation of the Canadian Pacific Railway Co. and other companies with regular services on the Atlantic and Pacific. But the European war, and later the Russian political disorders, caused all these international through traffic arrangements to be suspended.

Subsequently the International Through Traffic Railway Convention was concluded by the Second General Conference on Transportation of the League of Nations, held at Geneva in November, 1923, and to which the South Manchuria Railway Company adhered. Japan made persistent efforts to re-establish through traffic between the Far East and European Russia; the Soviet Government recognized this necessity, but negotiations did not reach a practical stage until the preliminary arrangement was made in December, 1926.

To-day, travelers between Europe and Japan or China, taking the South Manchuria Railway, can save a great deal in both expense and time. The first-class fare from Tokyo to London is Y.530, the time 16 days by rail, as against Y.1,100 and 30 days *via* America by steamer. From Shanghai to London, the fare is Y.600; the time 16 days by rail, and Y.1,050 and 41 days by steamer, *via* Suez.

The Growth of Traffic

During the last twenty-one years, there has been a remarkable growth of traffic on the South Manchuria Railway, despite all obstacles to progress, the constant activities of Manchuria bandits, and the frequent threat of civil war. The number of passengers carried has increased more than five-fold, and the tons of freight handled more than twelve-fold. The stupendous increase of freight, though augmented each year by shipments of coal mined by the Company itself, is due to the ever-increasing agricultural produce, especially the Manchurian bean. The number of passengers increased more than five times in the period—an increase wholly due to the third-class passenger. On the other hand, first and second-class passengers rather show a decrease. The express train service, including Pullman cars and American dining and observation cars, is maintained for the international traffic, and is run at a loss.

The table below shows the growth of freight and passenger traffic:

TONS OF FREIGHT

Items	1907-8	1927-8
Coal	165,521	8,830,593
Beans ...	202,857	2,696,405
Beancake ...	637,773	423,915
Kaoliang ...	—	895,425
Millet... ...	—	428,135
Flour ...	12,410	207,775
Other Grain...	73,847	601,703
Lumber ...	—	463,603
Salt	47,012	193,308
Mineral Products ...	—	393,493
Other Items ...	852,469	3,293,421
Total ...	1,491,859	18,427,775

PASSENGERS

Passengers	1907-8	1927-8
1st Class ...	39,152	13,275
2nd ,, ...	925,493	157,724
3rd ,, ...	547,586	8,092,090
Total ...	1,512,231	8,263,089

Railway Workshops

Originally, during the Russian regime, a railway workshop stood within the compound of Dairen Station. After the Company had taken charge in 1907, it was decided to build a new modern-equipped workshop on an extensive scale at Shakako, near Dairen. Construction work was commenced toward the end of 1908 and completed in August, 1911. These shops have the capacity of executing repairs simultaneously on 27 locomotives, 36 passenger cars, and 130 freight cars, while at the same time, constructing or repairing other railway material, mining machinery, etc. The Shakako shops are among the largest in the Orient. Of the rolling stock now in use, 105 locomotives, 281 passenger cars, 4,179 freight cars, and 145 caboose cars were constructed at Shakako. In addition, a number of orders have been filled for the Chosen Government Railways and Chinese Government Railways. Another repair shop on a smaller scale is located at Liaoyang. The Company has invested more than Y.8,700,000 in these shops where to-day 1,387 Japanese and 1,508 Chinese are employed. During the fiscal year ending March 31, 1928, 229 locomotives, 454 passenger cars and 2,186 freight cars were repaired and reconstructed, while 78 locomotives, 20 second-class passenger cars, 15 parcel-post cars, 1,013 freight cars, and 100 caboose cars, were constructed or assembled. The total expenditure on the shops during the year amounted to Y.11,506,363.

Book Notes

THE WASHINGTON CONFERENCE AND AFTER by Yomato Ichihashi, 1928, Stanford University Press, Stanford University, California.

Professor Ichihashi is Associate Professor of Japanese History in Stanford University and was secretary and interpreter to Viscount Kato at the Washington Conference. He therefore deals with the Conference at first hand. He seems to be associated with the California Group of Historians on Far Eastern Questions which include such really important scholars as Professors Payson J. Treat and Paul Hibbert Clyde. This group and their students are making increasingly important contributions to Far Eastern historical literature—not the generalized journalistic effusions which marked a previous generation of writers such as Thomas F. Millard, who carelessly threw together a volume on a timely subject. The work of the California group represents genuine research on specific phases of the Far Eastern situation.

Professor Ichihashi's book is a résumé of the work at the Washington Conference from the standpoint of a Japanese liberal. He does not attempt to defend his country; he is a historian, not a propagandist. He tells the story accurately and concisely. It is interesting, therefore, to note that he reaches the conclusion that the Washington Conference was of British origin and initiative and it cites the attitude of particularly the French and Japanese press because of this assumption.

There can be no question but that Great Britain was at that time, faced with two serious problems, one was to cut down the cost of armaments at a moment when Britain's war debts and demobilization were requiring such huge financial commitments; the other was the necessity of placating American objections to the Anglo-Japanese Alliance while at the same time avoiding giving offense to Japan which had been a faithful ally. A conference called by the United States, under American leadership, afforded an excellent opportunity to find a solution for both problems.

Japan, on the other hand, tended to view the Conference with suspicion. Japan had so often been the "goat" that any union of the so-called white nations to solve Asiatic questions naturally aroused Japanese suspicions as to the real motives. At Shimonoseki, at Portsmouth, in Siberia, in the Shantung issue, Japan had not gained the full fruits of her enterprise because of this union of the Europeans. It is not surprising, therefore, that Japan wondered what it was all about. But Japan entered the Conference and assisted in pouring oil on the troubled waters of Far Eastern relations. The separate settlement of the Shantung affair was undoubtedly the most notable result from the Japanese stand-point.

The Four Power Treaty, the amplified successor to the Anglo-Japanese Alliance, was the achievement of American diplomacy which most seriously affected Japan's pre-eminence in the Far East. It substituted American for Japanese leadership and therefore has offended Japan's pride. It added the United States and France to the Anglo-Japanese Alliance and removed from it, its offensive-defensive characteristics, making it a toothless talkfest document like the Covenant of the League of Nations. Professor Ichihashi's chapter on this subject is the most important in his book.

G. E. S.

Port Development of Nanking

(Continued from page 344).

tickets should be sold at this station for all points on the Tientsin-Pukow railroad and baggage should be booked through from Hsia Kwan. The location is convenient and the change would benefit the majority of users. Congestion would be relieved on the bund street, and more space would be available for the business of the port.

Eventually the bund street will probably become a park. That is to be expected when adequate piers and slips are provided elsewhere for the handling of ocean vessels and river commerce. The present bund should be abandoned as such. The practice of carrying ship cargo across a bund street to godowns is wasteful and interferes with the safe movement of street traffic.

All piers, transit sheds, godowns, etc. on the Nanking side should be the property of the government and leased to the various shipping interests by a government commission of port administration. As it is desirable to develop the Pukow side for heavy industrial uses it would be well to permit the private construction of piers, bulkheads, transit sheds, godowns, etc. by such industries as may desire to so do at their own expense. Each such private development would necessarily be subject to government approval of plans. It is felt that the port development as herein outlined can be self-supporting from the start and an important factor in the economic and industrial life of a very large section of China.

The Production of Iron and Steel in Japan

By J. H. Ehlers, Acting Commercial Attaché, Tokyo

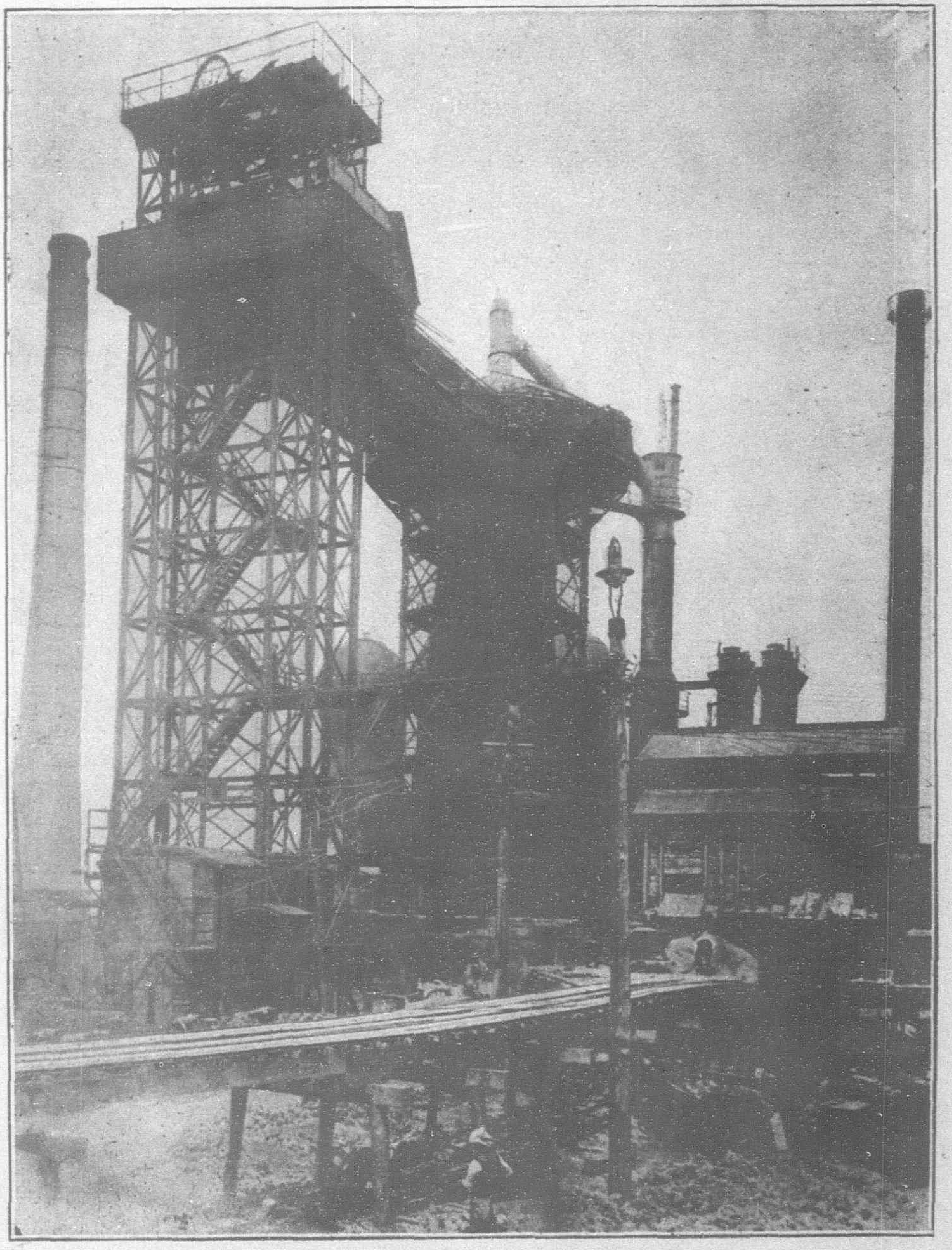
The following is taken from a pamphlet on the same subject by J. H. Ehlers, Acting Commercial Attaché, Tokyo, and published by the Department of Commerce.

Introduction

WHILE Japan does not rank with the great steel-producing nations of the world, its position is steadily gaining in importance. Because of the development of the Japanese industry in recent years and because Japan has been and is even now one of the principal markets of the world for steel products, the expansion of the industry of that country is of especial interest to the industries of the United States, Great Britain, and Germany, and to a lesser extent to the industries of Belgium and Luxemburg, France and Sweden, all of which now sell iron and steel products in Japan.

Japan is also worthy of consideration as a producer of steel and steel products quite apart from its importance as a consuming market. In 1928 and for several years past Japan has ranked tenth among the countries of the world in volume of steel produced, production having risen from 255,000 metric tons in 1913 to an estimated total of 1,680,000 tons in 1928.

This development, a truly remarkable performance in view of the many factors tending to restrict it, could scarcely have taken place except under the peculiar economic system prevailing in Japan, a system under which the Government is in a position to foster the expansion of industries despite natural or economic disadvantages. The profits returned by the industry have scarcely been such as to warrant the expansion which has taken place over the last eight years, yet over this period production has virtually doubled—figures for 1920 indicate an output of 804,133 tons of ingots in that year against an estimated output of 1,680,000 tons in 1928—and existing equipment has been enlarged to a considerable extent, this last being the result of the belief that the natural obstacles present can be overcome and that the local industry will continue to receive Government support and protection.

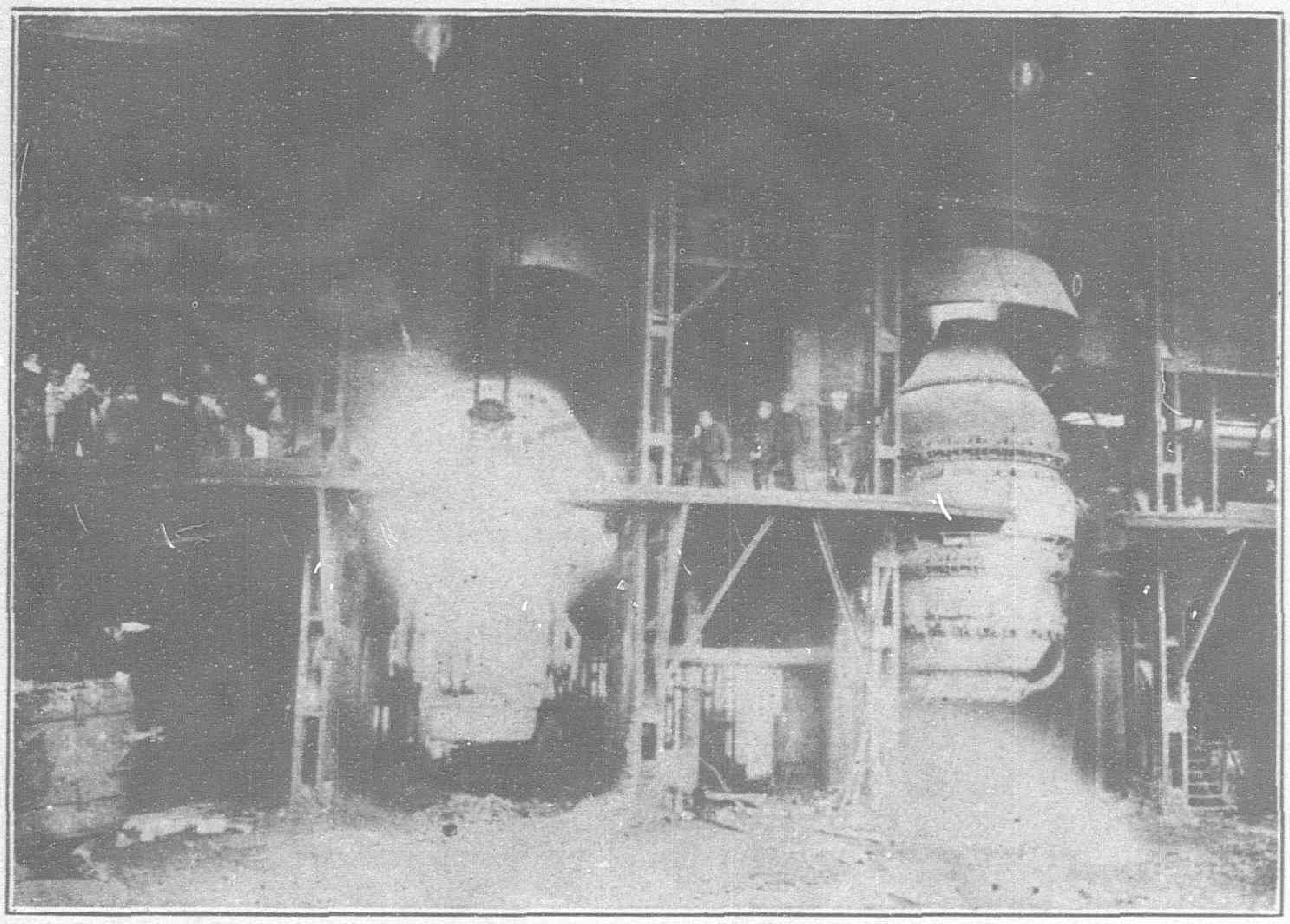


No. 1 Blast Furnace of the Japan Steel Works

Postwar Depression

During the war the Yawata Iron Works was unable to hold its place in the expansion of the domestic industry. In 1918 its pig-iron output was only 38 per cent. of the country's production and its steel production 57 per cent. The total productive capacity of the country at this time (1918) was almost equal to the requirements for domestic use. At the end of the war the prosperity of the iron and steel makers came to an end; prices fell rapidly, pig iron from Y.350 a ton in 1918 to under Y.100 in 1920 and to Y.66 in 1923. Steel bars fell from Y.420 to Y.120, and steel plate dropped from over Y.800 to Y.120. High dividends were paid during the war and great expansion schemes indulged in, leaving very few of the companies in a position to pass through the slump satisfactorily. Some of the smaller companies were forced out of business. The Japan Steel Tube Co., the Japan Steel Works, and others were forced to reduce their capital radically; the Oriental Iron Manufacturing Co. was compelled to turn its mills over to the Yawata works, and other radical readjustments had to be made. This resulted in bringing the domestic production of pig iron from 65 per cent. of the demand in 1919 to 48 per cent. in 1924; while the domestic production of plates decreased from 47 per cent. in 1919 to 36 per cent. in 1924. At the end of 1923 the status of private iron and steel companies was as follows: Pig-iron industry, 16 companies closed, 8 companies in operation; steel makers, 16 companies closed, 21 companies in operation. The industry fell into a period of great difficulties and its entire economic foundation was questioned.

The steel industry has never recovered to a satisfactory position since the panic of 1920, although now, in 1929, prospects seem brighter than they have since the end of the war. In 1925 eight important steel companies made an average profit of 2½ per cent. of their paid-up capital. In 1926



Yawata Steel Works: Rotary Furnaces

private steel companies, in which Y.230,000,000 is said to be invested, showed a profit of only Y.9,000,000. Only two companies—the Kawasaki Dockyard Co. and the Osaka Iron Works—showed profits of 5 per cent, and both of these companies were compelled to go through a radical readjustment program in 1927.

The following table, compiled from a great variety of sources, shows the position of the leading steel companies :

Leading Steel Companies of Japan

Name of company	Established	Capital in yen		Profit (+) or loss (−)	
		Authorized	Paid up	Yen	Period
Sumitomo Seikosho (Sumitomo Steel Works).	1901	12,000,000	9,000,000	+424,805	July 1 to Dec. 31, 1927.
Kobe Seikosho (Kobe Steel Works) ...	1905	20,000,000	20,000,000	−178,638	Do.
Nippon Seikosho ... (Japan Steel Works).	1907	30,000,000	30,000,000	+119,317	Dec. 1, 1926, to May 31, 1927.
Tobata Imono K. K. (Tobata Casting Co.)	1910	5,000,000	4,325,000	+365,906	Do.
Osaka Steel Sheet Manufacturing Co. (Osaka Teppan Seijo K. K.).	1911	4,000,000	2,500,000	+250,000	Apr. 1 to Sept. 30, 1927.
Nippon Kokan K.K. (Japan Steel Pipe Co.).	1912	21,000,000	15,225,000	+132,548	Dec. 1, 1926, to May 31, 1927.
Nippon Tokushuko G. K. (Japan Special Steel Co.)	1915	1,370,000	1,370,000	———	
Tokai Kogyo K.K. (Tokai Industrial Co.).	1916	3,000,000	2,250,000	+92,465	May 1 to Nov. 1, 1927.
Fuji Seiko K.K. (Fuji Steel Manufacturing Co.).	1917	3,100,000	3,100,000	+5,060	Dec. 1, 1926, to May 31, 1927.
Mitsubishi Seitetsu K.K. (Mitsubishi Iron Co.).	1917	25,000,000	25,000,000	+13,452	Apr. 1 to Sept. 30, 1927.
Kamaishi Kozan K. K. (Kamaishi Mining Co.).	1917	20,000,000	20,000,000	+1,693	June 1 to Dec. 1, 1927.
Toyo Seitetsu K. K. (Oriental Iron Manufacturing Co.).	1917	36,000,000	30,000,000	+142,080	Do.
Oshima Seikosho (Oshima Steel Works).	1917	6,000,000	4,920,000	+118,099	Jan. 11, 1926, to Apr. 30, 1927.
Asano Kokura Seikosho (Asano Kokura Steel Works).	1918	15,000,000	6,000,000	−69,700	June 1 to Nov. 30, 1927.
Daido Denki Seikosho (Daido Electric Steel Works).	1921	2,800,000	2,800,000	+127,039	Oct. 1, 1927, to Mar. 31, 1928.

Pig Iron.—Production

Japanese pig iron production takes place in three areas—Japan proper, Chosen, and Manchuria. Japan proper has three iron-smelting districts, the Kyushu district, the district embracing the northern part of the main island (Honshu), and southern Hokkaido ; in addition, one furnace is being operated in the Tokyo district. The 1926 production was distributed as follows : Kyushu, 58 per cent ; Manchuria, 18 per cent ; northern Japan and Hokkaido, 14 per cent ; Chosen, 10 per cent. There is a distinct market for pig iron in Japan, and this will unquestionably increase as the industrialization of the country progresses.

The production of pig iron in Japan has shown a continuous increase since the establishment of the industry on a modern basis, despite many fluctuations in fundamental factors determining the economy of production. Output has increased from a total of 237,775 tons in 1912 to 884,233 tons for Japan proper in 1927. The combined production of Japan and Chosen passed the 1,000,000 ton mark for the first time in 1927, while production in the whole area, including Manchuria, was 1,254,504 tons.

The production of pig iron and ferro-alloys in Japan is detailed in the following table. The importance of Chosen and Manchuria is obvious from an inspection of the figures. Nearly all of this production comes to Japan with the exception of small amounts retained in the producing areas for casting purposes. The great increase in the Manchurian production during the past few years is of especial interest. The constantly increasing production in this area would indicate that the technical problems involved in the utilization of low-grade ores were being solved, although the figures do not necessarily indicate that this production is being conducted on a profit-making basis as yet, for the South Manchuria Railway, the company engaged in this production, is a semi-governmental institution and has resources sufficient for carrying on experimental work over a period of years. The fact remains, however, that it is becoming a dependable and important source of pig iron supply for Japan.

Production of Pig Iron and Ferro-Alloys in Japan

[In metric tons]

Year	Pig iron				Total, including Manchuria	Ferro-alloys	Grand total
	Japan	Chosen	Total	Manchuria			
1912	237,755	......	237,755	......	237,755	1,413	239,168
1913	240,363	......	240,363	......	240,363	2,313	242,676
1914	300,221	......	300,221	......	300,221	1,505	301,726
1915	317,748	......	317,748	29,909	437,657	2,879	350,536
1916	388,691	......	388,691	49,022	437,713	3,201	440,914
1917	450,642	......	450,642	38,610	489,252	12,150	501,402
1918	582,758	42,698	625,456	45,712	671,168	23,670	694,838
1919	595,518	78,384	673,902	106,082	779,984	17,091	797,075
1920	521,036	84,118	605,154	116,037	721,191	8,839	730,030
1921	472,725	83,010	555,735	93,951	649,686	7,575	657,261
1922	550,845	83,179	634,024	59,842	693,866	8,465	702,331
1923	559,698	99,933	699,631	97,849	797,480	11,053	808,533
1924	585,930	99,795	685,725	134,376	820,101	12,475	832,576
1925	685,178	99,160	784,338	136,685	921,023	10,933	931,956
1926	809,624	115,036	924,660	198,143	1,122,803	12,208	1,135,011
1927	884,233	126,132	1,010,365	244,139	1,254,504	13,000	1,267,504
1928					1,507,764		

Blast-Furnace Equipment

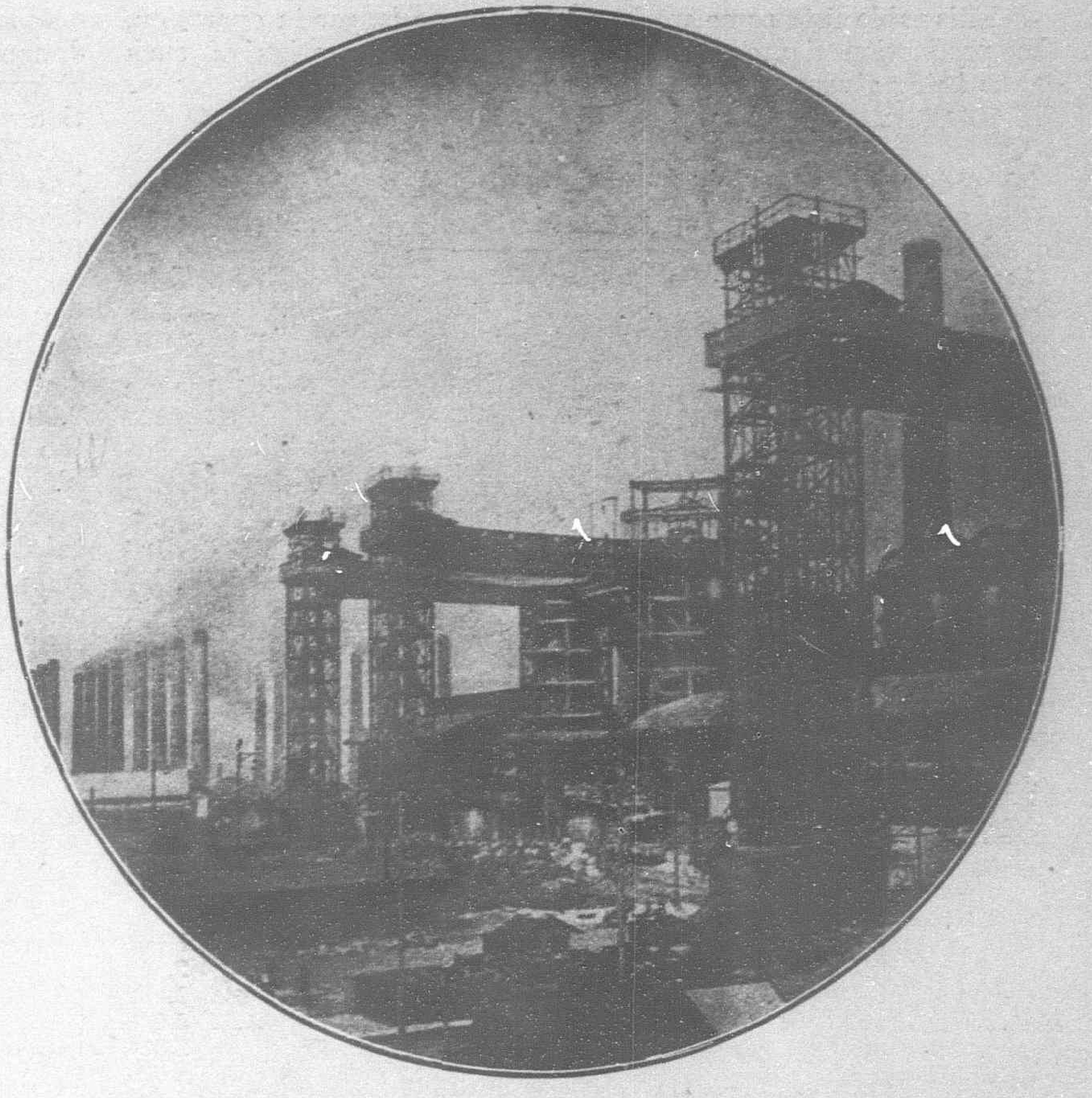
In general, the blast-furnace equipment of Japan is by no means up to date. Although pig iron is often produced cheaply in many countries in somewhat antiquated blast furnaces, and while the stacks themselves may not be of great importance, except as to size, the auxiliary equipment determines the economy of the plant. In many Japanese plants, however, this is not of late type, and in the interests of economical production might well be modernized or replaced.

Japan proper has 15 blast furnaces of a daily capacity of 100 tons or over, 1 being rated at 300 tons and 8 between 200 and 300 tons. The equipment of Chosen consists of 2 furnaces of 130 tons capacity, while Manchuria has 2 furnaces of 300 tons as well as 2 of 150 tons daily capacity.

The next table shows the location of this blast-furnace equipment. The two 100-ton furnaces (Nippon Steel Works) shown in the list are now closed down permanently. Contemplated changes in equipment involve the erection of 2 furnaces of 500 tons at Yawata, 1 of 500 tons at Anshan, the installation of 1 new 200-ton furnace by the Kamaishi Mining Co., the possible addition of some capacity by the Asano Iron Works at Tsurumi, and the construction of two 170-ton furnaces by the Japan Steel Co.'s plant at Wanishi, Hokkaido. The Asano interests are considering the erection of a 350-ton furnace at Osaka. No pig iron is at present being produced in that district.

The rated productive capacity is 1,500,000 tons per year. The contemplated equipment would bring the productive capacity to over 2,500,000 tons theoretically, but actually to about 2,000,000 tons, since some of the contemplated equipment is to replace existing furnaces which will then be closed down.

The erection of Yawata's two 500-ton furnaces is likely to be postponed for several years, owing to political developments. It is not believed probable that furnaces actually put into operation in the coming three or four years will increase the rated capacity of operating furnaces more than 300,000 tons. Their construction will, however, increase the ratio of production to rated capacity, since they will replace some of the marginal furnaces of lowest efficiency which operate least often.



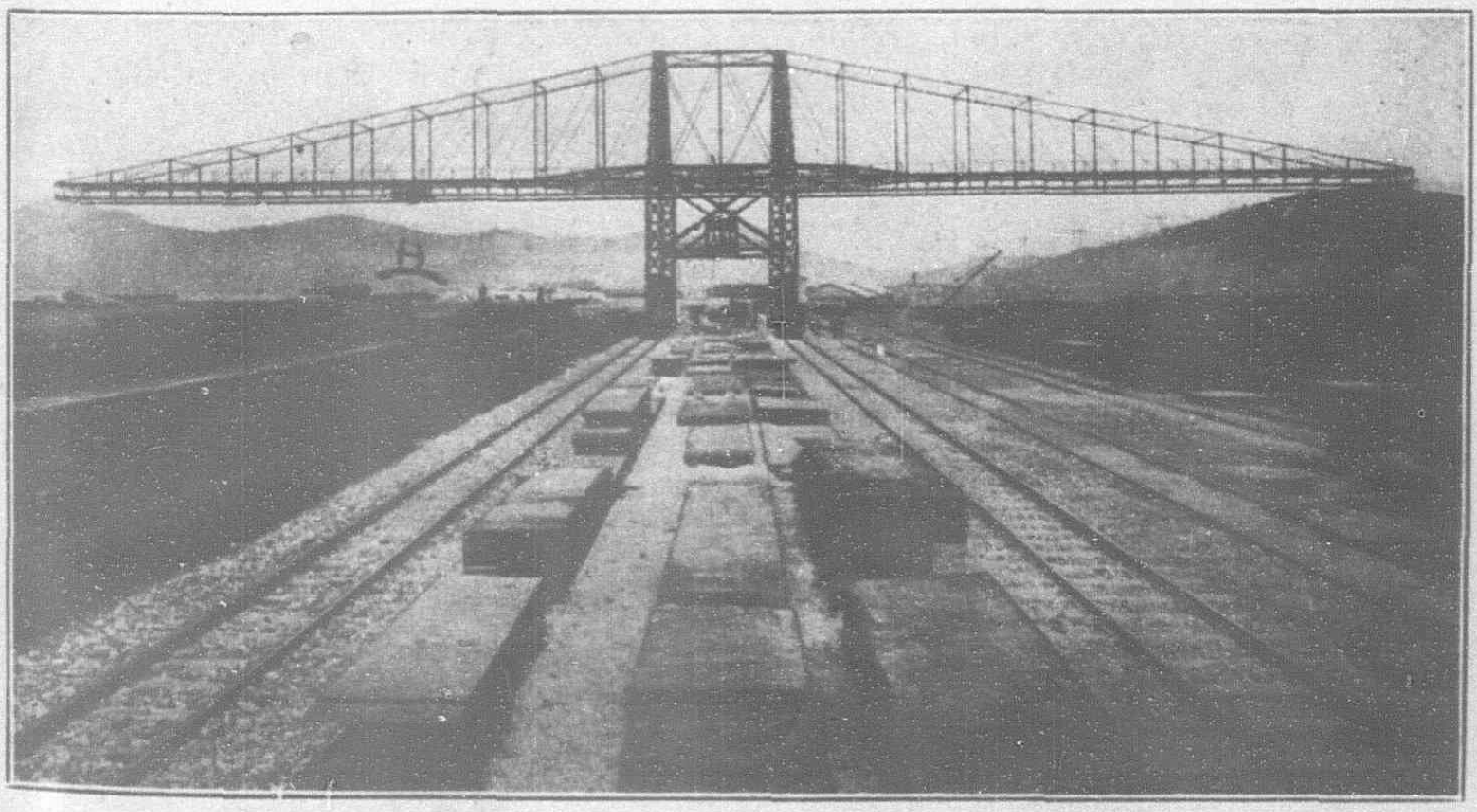
Blast Furnaces at the Yawata Iron and Steel Works, Japan

JAPANESE BLAST FURNACES

Name	Daily capacity in metric tons											Total furnaces	Annual capacity
	300	270	250	230	200	150	130	120	100	60	25 and under		
JAPAN PROPER													
Yawata Steel Works	..	2	..	1	3	..	..	..	..	..	..	6	465,800
Kamaishi Mining Co.	..	..	..	..	2	..	..	..	..	1	1	4	164,900
Nippon Steel Works (Wanishi)	..	..	..	..	..	..	..	3	1	..	..	4	156,400
Toyo Iron Manufacturing Co. ..	1	..	..	..	..	1	..	..	..	..	..	2	153,000
Asano Shipbuilding Co. (Tsurumi)	..	..	..	..	..	1	..	..	..	..	..	1	51,000
Nippon Steel Pipe Co.	..	..	..	..	..	..	..	..	..	..	3	3	23,800
Asano Kokura Steel Works ..	..	..	..	..	..	..	..	..	..	..	2	2	13,600
Okura Mining Co..	..	..	..	..	..	..	..	..	..	..	2	2	13,600
Sennin Iron Manufacturing Co. ..	..	..	..	..	..	..	..	..	..	..	2	2	9,180
Kobe Steel Works.	..	..	..	..	..	..	..	..	..	..	1	1	6,800
Yosuki Seikojo ..	..	..	..	..	..	..	..	..	..	..	1	1	5,100
Shiribeshi Iron Manufacturing Co.	..	..	..	..	..	..	..	..	..	..	1	1	6,800
Kuji Steel Works .	..	..	..	..	..	..	..	..	..	..	1	1	3,400
CHOSEN													
Mitsubishi (Kenjiho) Iron Works	..	..	..	..	..	2	..	..	..	..	..	2	120,000
MANCHURIA													
Honkeiko Iron Works (Penhsihu)	..	..	..	..	..	2	..	..	..	..	2	4	102,000
Anshan Steel Works	..	..	2	..	..	..	..	..	..	..	..	2	280,000
Total . ..	1	2	2	1	5	4	2	3	1	1	16	38	1,590,680

NOTE.—These data were taken from the records of the Mining Bureau of the Japanese Department of Commerce and Industry. Cupolas for remelting iron are included. Practically all of the furnaces listed as of 25 tons and under capacity are for remelting.

43912—29——2



Yawata Steel Works: Storage Yard With Traveling Crane

Companies Engaged

The following table divides production by companies. The figures for 1926 reveal the fact that only four plants in Japan proper reported a production of pig iron for that year. Only two plants in Japan proper produced over 100,000 tons in 1926—the Yawata Steel Works and the Toyo Iron Manufacturing Co., which is operated by Yawata. The Anshan Iron Works in Manchuria, and the Kenjiho Iron Works in Chosen each produce over 100,000 tons of pig iron per year. The production of the Anshan works passed the 200,000-ton mark for the first time in 1927.

Of the five works having blast furnaces in Japan proper the Kamaishi Mining Co. and the Nippon Steel Works at Wanishi operate in considerable part on domestic ores obtained in the vicinity of the blast furnaces, while the Yawata Steel Works, the Toyo Iron Works, and the Asano Shipbuilding Co.'s works at Tsurumi operate almost exclusively on imported ores.

This table lists some works which are no longer in operation, the production figures for the last year of operation of such works being given.

PIG IRON PRODUCTION IN JAPAN, BY COMPANIES

[In metric tons]

Companies	Year	From ore				Remelted		Total
		Blast furnace Coke	Blast furnace Charcoal	Electric furnace	Sponge iron	Cupola	Electric furnace	
Yawata Seitetsujo (Yawata Steel Works).	1917	304,618	...	...	...	...	...	304,618
	1924	424,545	...	...	...	...	...	424,545
	1925	456,284	...	...	...	...	...	456,284
	1926	532,908	...	...	...	...	...	532,908
	1927	540,499	...	...	...	...	...	540,499
Nippon Seikojo (Nippon Steel Works), Wanishi plant.	1917	44,998	...	...	...	...	...	44,998
	1924	47,183	...	...	...	...	...	47,183
	1925	73,439	...	...	...	...	...	73,439
	1926	94,629	...	...	...	...	...	94,629
	1927	92,204	...	...	...	...	...	92,204
Kamaishi Kozan K.K. (Kamaishi Mining Co.), Kamaishi plant.	1917	59,285	2,956	...	...	...	...	62,241
	1924	54,271	...	...	...	...	219	54,490
	1925	47,443	...	...	...	...	...	47,443
	1926	64,615	...	...	...	...	...	64,615
	1927	67,683	...	...	...	...	...	67,683
Takata Kogyo K. K. (Takata Mining Co.), Ohtera plant.	1919	...	...	1,191	...	...	...	1,191
	1920	...	...	2,736	...	...	...	2,736
	1921	...	...	1,241	...	...	...	1,241
	1922	...	...	98	...	...	189	287
	1924	...	...	268	...	...	...	268
Tokyo Kozai K.K. (Tokyo Steel Products Co.), Hirota plant.	1918	...	...	891	...	...	...	891
	1921	...	...	...	...	...	1,167	1,167
	1922	...	...	...	...	...	2,310	2,310
	1923	...	...	1,577	...	...	6	1,583
K.K. Sumidagawa Seitetsujo (Sumidagawa Iron Refinery).	1917	...	...	...	...	5,355	...	5,355
	1923	...	...	...	...	2,354	...	2,354
	1924	...	...	...	...	528	...	528
	1925	...	...	...	...	437	...	437
Nippon Kokwan K.K. (Nippon Steel Pipe Co.)	1918	709	...	...	5,697	...	...	6,406
	1919	4,357	...	...	2,635	...	12	7,004
	1920	3,177	...	...	1,090	...	...	4,267
	1923	...	...	...	...	...	48	48
Asano Shipbuilding Co.	1927	22,164	...	...	...	...	...	22,164
Fuji Seiko K.K. (Fuji Steel Manufacturing Co.)	1918	...	...	...	...	2,286	...	2,286
	1919	...	...	...	...	335	...	335
	1920	...	...	...	...	1,300	...	1,300
Nippon Kokwan K. K. (Nippon Steel Pipe Co.)	1920	...	...	1,644	...	...	...	1,644
	1921	...	...	493	...	...	1,450	1,943
	1922	...	...	...	...	...	255	255
Mitsubishi Zosen K.K. (Mitsubishi Shipbuilding Yard), Kobe plant.	1919	...	...	...	...	154	...	154
	1924	...	...	...	...	163	...	163
	1925	...	...	...	...	153	...	153
	1926	...	...	...	...	245	...	245
	1927	...	...	...	...	95	...	95
Okura Kogyo K.K. (Okura Mining Co.), Sanyo plant.	1917	...	2,388	...	...	...	...	2,388
	1920	...	6,997	...	...	...	...	6,997
	1921	...	8,027	...	...	...	...	8,027
	1922	...	2,806	...	...	...	...	2,806
Tobata Imono K. K. (Tobata Casting Co.)	1918	...	...	...	...	5,783	...	5,783
	1924	...	...	...	...	1,194	2,973	4,167
	1925	...	...	...	...	553	3,686	4,239
	1926	...	...	...	...	...	6,236	6,236
	1927	...	...	...	...	...	6,594	6,574
Toyo Seitetsu K. K. (Toyo Iron Manufacturing Co.)	1919	20,624	...	...	...	...	...	20,624
	1924	52,550	...	...	...	...	...	52,550
	1925	99,713	...	...	...	...	...	99,713
	1926	107,331	...	...	...	...	...	107,331
	1927	161,791	...	...	...	...	...	161,791
Nippon Seitetsu K. K. (Nippon Iron Manufacturing Co.), Orio.	1918	2,800	...	...	...	...	...	2,800
	1919	18,360	...	...	...	...	...	18,360
	1920	8,917	...	...	...	...	...	8,917
Mitsubishi Seitetsu K.K. (Mitsubishi Iron Manufacturing Co.)	1918	42,698	...	...	...	...	...	42,698
	1924	99,795	...	...	...	...	...	99,795
	1925	99,160	...	...	...	...	...	99,160
	1926	115,036	...	...	...	...	...	115,036
	1927	122,022	...	...	...	...	...	129,022

Blast Furnaces in Japan

It will be of interest to note a few of the more outstanding features of the leading iron works of Japan, although no attempt will be made to give a technical description of the equipment, much of which is old. At the present time many of the furnaces are being remodeled and generally improved, while new furnaces are being planned to replace the less economical of the older ones. The companies are not hampered by poor and antiquated equipment, however, as much as by the high cost of coke and other generally high expenses.

Pig iron is produced in five districts, three of which are in Japan proper. These districts are northern Japan and Hokkaido, Tokyo, Kyushu, Chosen (Korea), and Manchuria. A brief description of a plant in each district follows.

Japan Steel Works.—The Japan Steel Works (Nippon Seikojo) has a blast-furnace plant at Wanishi, near its Muroran steel plant, in the Hokkaido district. The blast furnaces were constructed to utilize Hokkaido coal as well as Hokkaido ores. The company owns 3,000 acres of iron-ore properties, as well as many iron-sand properties.

The Kutchan (or Guchian) mine, containing limonite, with 45 to 53 per cent. iron content, sulphur 0.5 per cent, phosphorus 0.06 per cent, is the principal mining property and the source of the domestic ore used in the blast furnaces. This ore has a very high moisture content and in damp weather absorbs moisture to an extent that causes difficulties. It supplies somewhat over one-third of the ore used by these works, the remaining amounts coming from China and Chosen. The Chinese ores cost about Y.9 per ton delivered, while the Hokkaido ores are somewhat cheaper, transportation expenses being the principal element in their cost. The Hokkaido ores are very easily reducible, but often form crusts and create difficulties in the air circulation in the furnace. Limestone from northern Japan, as well as the Chinese ores, is landed at Muroran, both being shipped the remaining few miles by rail.

The coal used is from the Yubari mines, in central Hokkaido, which are controlled by the Mitsui interests. The coal costs about Y.10 per ton. It cokes very easily and has a very low sulphur content. The coke, however, is brittle, high in ash, and difficult to use in blast-furnace work.

The present works were based on the old blast-furnace works called the Wanishi Iron Works, which operated two 100-ton blast furnaces. In 1918 this company was purchased by the Mitsui interests and the Hokkaido Coal Mining & Steamship Co. In 1919 it was amalgamated with the Japan Steel Works, which has extensive Mitsui interests and some British (Vickers) interest. In 1924 two new 120-ton blast furnaces were constructed and a complete by-products plant was built. Thus, there are now four blast furnaces available, although the operation of the two 100-ton furnaces has been indefinitely suspended. The furnaces are of German type, with brick stacks and steel hoops.

There is also a coal-washing plant handling 70 tons per hour and two batteries of coke ovens of 30 ovens each. These were built by the Miike Machine Manufacturing Co. (controlled by the Mitsui interests) and are along the lines of the Koppers ovens. This plant produces most of the by-product coke ovens in Japan. A modern by-products plant was built in 1926 and has a daily production of 6 tons of benzol, 8 tons of creosote, 20 tons of pitch, 25 tons of coal tar, and 10 tons of sulphuric acid.

The production of pig iron in 1917 was 45,000 tons. This rose to 116,000 tons in 1918 and fell off to 40,000 tons in 1921, remaining at about this figure until 1925, when, with the new furnaces in operation, it increased to 73,000 tons for that year and to 95,000 tons in 1926.

The erection of one, and eventually two, 170-ton furnaces is planned. This will probably involve the closing down of the 120-ton furnaces and their retention for emergency use only.

Asano Shipbuilding Co.—The Asano Shipbuilding Co., with a plant at Tsurumi, near Yokohama, which has operated a plate mill for the past 10 years or more, has erected a blast furnace and two 50-ton open-hearth furnaces, commencing operations last year. This is the newest equipment in Japan and the only smelter in the Tokyo district. The blast furnace has a daily capacity of 150 tons. It is approximately 70 feet in height, with a maximum inside diameter of 18 feet. The stack body is of German type, while the remainder is designed after American types. The entire plant, with the exception of the American parts of the air preheating system and of the charging equipment for the open hearth and the British boilers, was designed and made in Japan.

The ore used in this plant is brought from the Elephant Nose Mine on the Yangtze River in China. It is high-grade hematite, with 60 per cent. iron content. The Asano company has a contract with the Chinese mining company for the delivery of this ore and is one of the few companies in Japan receiving ore without having a financial interest in the mine. The coking coal is brought in from the Yubari Mine in Hokkaido. This is delivered to a coke company which is a subsidiary of the Asano company.

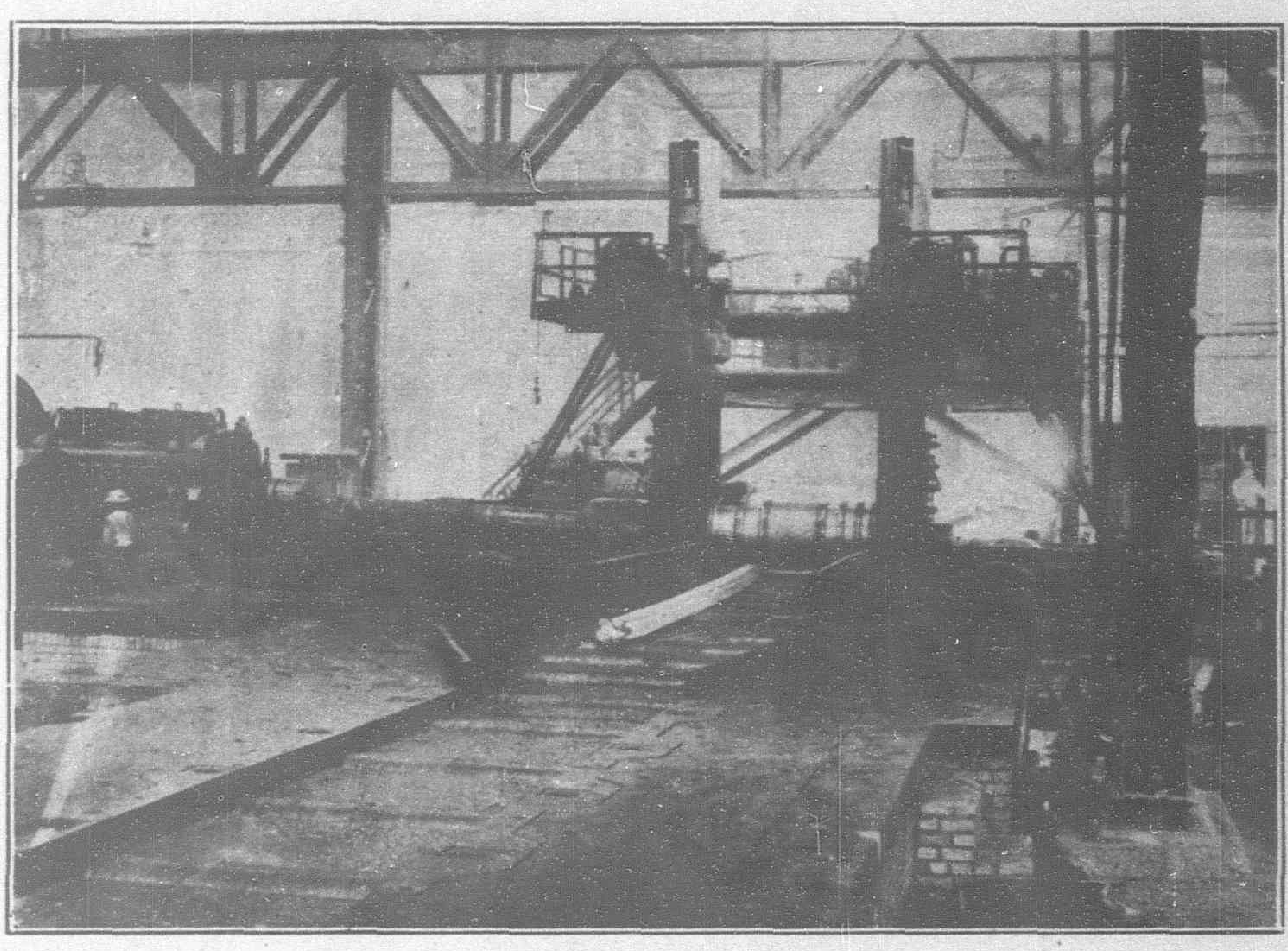
The plant is located on the water front, permitting direct unloading alongside of both coal and ore ships up to 3,000 to 4,000 tons burden. The furnace produces about 50,000 tons of No. 3 pig iron per year. In addition to supplying the needs of the open hearths, the product is used extensively in foundry work in the Tokyo district.

Yawata Steel Works.—The first blast furnace of the Government's Yawata works, in the Kyushu district, was blown in in 1901. It has a rated capacity of 58,000 metric tons per year and produced 30,000 tons of pig iron the first year. It was then shut down for about two years until July, 1904. Another furnace was built at this time and the annual productive capacity increased to 102,000 tons. In 1905 the production rose to 88,000 tons, the Russo-Japanese War being a great stimulus to the entire iron industry. In 1911 additional productive capacity was provided, and production rose to 177,000 tons in 1912 and to about 220,000 tons in 1913. The World War then created a demand for additional output, and in 1916 another furnace was added, and the production rose to over 300,000 tons in 1917. The productive capacity was again increased in 1921, and production rose to 400,000 tons in 1922 and 530,000 tons in 1926.

The equipment consists of 6 blast furnaces, 2 of 270 tons daily capacity, 1 of 230 tons daily capacity, and 3 of 200 tons daily capacity. The annual capacity is rated at 465,800 tons.

The works are located at tidewater, convenient for receiving the foreign supplies of ore and coal on which the furnaces operate. Unfortunately, however, the layout of the blast-furnace plant is not ideal. The steel mills are placed on the shore side of the works, while the blast furnaces are inland, necessitating the transportation of the ore, which up to this point has been entirely water carried, by overhead cableways over the steel plant and rolling mills.

The ore used comes from the Malay Peninsula, China, Chosen, and smaller amounts from several mines in Niigata Prefecture, Honshu. The Malayan ore comes from a mine in Johore and additional supplies are expected from another mine to be opened in Trengganu. The Chinese ore comes from the Tayeh and Tao Chung mines principally, while the Korean ore comes from the Inritsu and Sainei mines.



Yawata Steel Works: Ingot Mill

Coal is supplied principally from the Futase colliery owned by the Yawata Steel Works. This mine furnishes 50 per cent. of the coking coal required by the works, with other Kyushu mines furnishing 40 per cent, and the remaining 10 per cent. coming from the Kaiping mines in North China. The Yawata works is better off in regard to receiving reasonably priced coal than the other iron works in Japan proper. It obtains coal for Y.9 to Y.10 per ton from its Futase colliery, and coke is produced at less than Y.15 per ton. Although this would be considered an absurdly high figure in most steel-producing countries, nevertheless it is cheaper than the coke supplied to any other blast furnace in Japan proper.

The steel works has 470 by-product coke ovens, of which 200 are what is known as Kuroda type and 270 are of American type.

Toyo Iron Manufacturing Co.—Since 1921 the Yawata Steel Works has been operating the Toyo Iron Manufacturing Co.'s blast furnaces, which are located near its own plant. The latter company found itself unable to produce iron economically and in 1921 turned its works over to the Yawata Steel Works for operation. These works have 2 furnaces, 1 of 300 tons daily capacity and 1 of 150 tons daily capacity, the rated annual capacity being 153,000 tons. Neither the product of the Yawata blast furnaces nor that of the Toyo Iron Works furnaces appears on the market, as the pig iron is used entirely for the production of steel by the Yawata Steel Works.

The Yawata Steel Works is the most important unit in the Japanese iron industry, as will readily be observed from the following tables. The production of the Yawata and the Toyo iron works blast furnaces is as follows:

PIG IRON PRODUCTION OF THE YAWATA AND TOYO WORKS

[In thousands of metric tons]

Year	Yawata production	Toyo production	Total	Total Japanese production*	Relation of Yawata-Toyo production to total
					Per cent
1917	305	...	305	451	67.5
1918	272	...	272	583	46.6
1919	281	21	302	596	50.6
1920	242	34	276	521	52.9
1921	307	47	354	472	75.0
1922	401	53	454	551	82.4
1923	441	50	491	560	87.5
1924	425	53	478	586	81.6
1925	456	100	556	685	81.1
1926	533	107	640	810	79.0
1927	540	162	702	895	78.4

*Not including Chosen and Manchuria.

In 1920 the Yawata blast furnaces produced 242,000 tons out of the total of 521,000 tons produced in Japan proper, or 47 per cent; in 1926, 533,000 tons out of the total of 809,000 tons, or 61 per cent. Including the production of the Toyo Iron Works blast furnaces, the output was 640,000 tons in 1926, or 79 per cent. of the total production of Japan proper, or 51 per cent. of the combined production of Japan, Chosen, and Manchuria.

Despite the Yawata's yearly increasing pig-iron production, it has been unable to supply its own steel-making requirements. In addition to its own pig iron, it is compelled to import large quantities from the Anshan works in Manchuria and from the Han Yeh Ping iron works in China, when the latter are in operation. No other pig iron is used by the Yawata works.

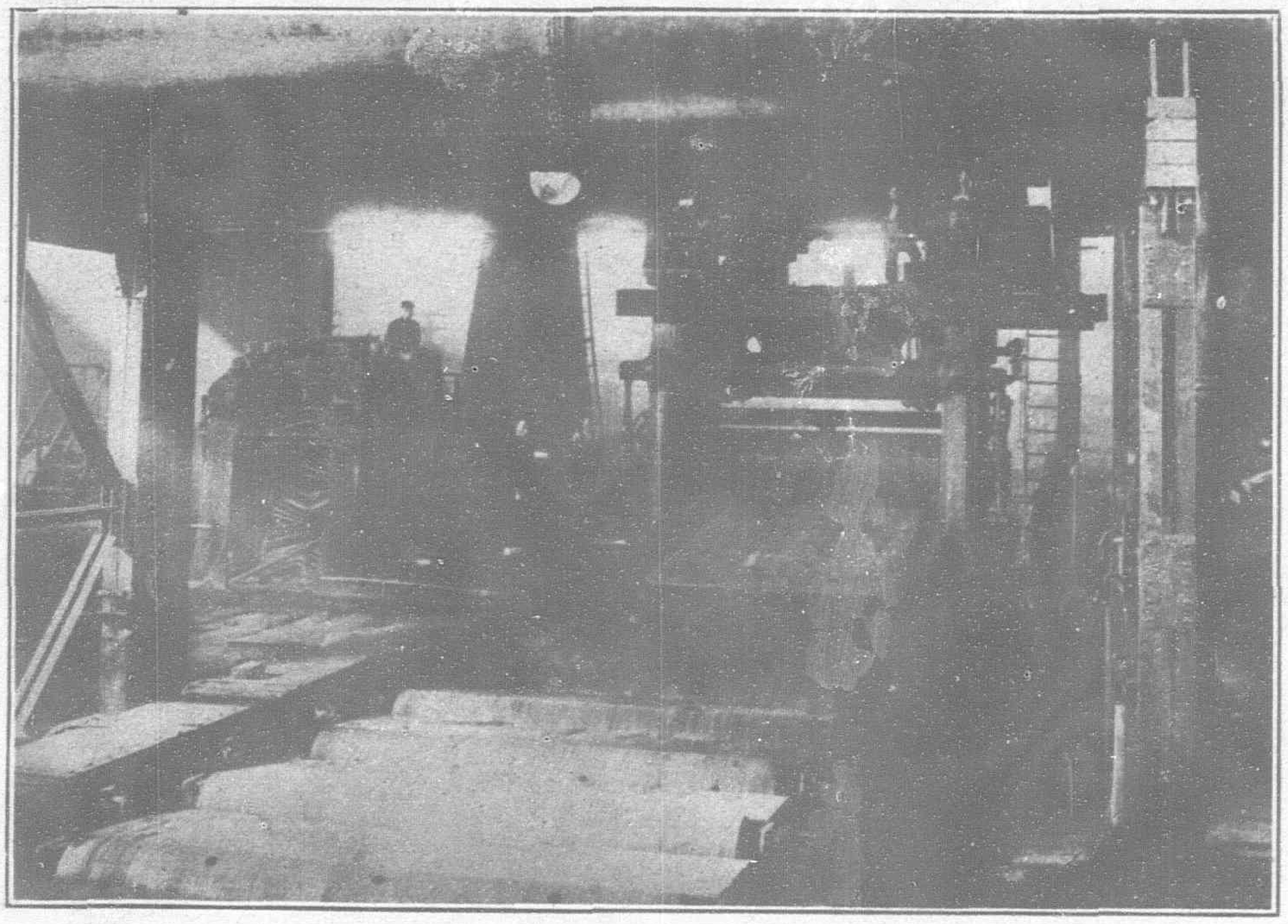
Mitsubishi Iron & Steel Co. (Ltd.).—The Mitsubishi interests operate an iron works in Chosen for the purpose of utilizing the Korean ores and coal. The company first purchased an iron mine at Kenjiho in 1911, and since that time has purchased other mines in this district. In 1913 it acquired control of the Taihomen colliery, and in 1915 a furnace department was organized, the company being incorporated in 1917 as the Mitsubishi Iron & Steel Co. (Ltd.) with a capital of Y.25,000,000. The first pig iron was produced in June, 1918, the capacity then being about 120,000 tons per year.

The present equipment consists of two 150-ton furnaces with stacks approximately 70 feet in height, most of the equipment being imported from America. There are 50 by-product coke ovens with a total annual capacity of 166,000 tons, the by-product produced being 2,500 tons of sulphuric acid, 2,300 tons of sulphate of ammonia, 5,000 tons of pitch, 1,000 tons of heavy oil, 830 tons of medium oil, 80 tons of light oil, and 580 tons of naphthalene.

This company owns the Taihomen and Chozan collieries in the Heianando district. In addition to the limonite ore from the mines which it owns in this district, the company imports annually from 40,000 to 50,000 tons of hematite from the Yangtze Valley.

Anshan Iron & Steel Works.—The most important iron works in Manchuria is the Anshan plant of the South Manchuria Railway, located on the main line of that railway between Dairen and Mukden, about 200 miles north of Dairen. Very ambitious plans were laid for this plant. The original designs provided for blast furnaces with an annual capacity of 1,000,000 tons, based on the idea of utilizing the low-grade ores. The region surrounding the Anshan furnaces is rich in ores; there are many large mines within an 8-mile radius. The largest of these has a reserve of 100,000,000 tons of ore above sea level and is so situated that open-cut mining methods can be used. Experiments carried on in beneficiating these ores met with but moderate success.

The construction of two blast furnaces of 250 tons daily capacity was undertaken in 1917 under American engineering advice, and early in 1919 one was blown in. The present works consist of two blast furnaces, four batteries of by-product coke ovens of 130 tons daily capacity each, and the usual auxiliary equipment. Only one furnace has been worked, and production did not reach the 100,000-ton mark until 1926.



Yawata Steel Works: Heavy Plate Mill

The mines contained a few million tons of fairly rich ores (about 52 per cent. iron content) which could be used directly in the furnaces, and initial operations were conducted exclusively on these ores. Such ores are now becoming more scarce, however, and are intermingled with the lean ores, so that the success or failure of the plant rests on the development and beneficiation of the low-grade ores. A plant for the concentration of these ores was completed early in 1926, and by their use the production for that year was brought up to 145,936 tons. The low-grade ores are concentrated to 58 per cent. iron content.

Two 250-ton furnaces, rated at 180,000 tons per year, have by interior reconstruction been altered to 300-ton furnaces and are now rated at 280,000 tons per year. The production in 1927 exceeded 200,000 tons.

Designs are being prepared for the construction of one 500-ton furnace, which is expected to be in operation early in 1930. American engineers are being consulted in connection with this construction. It is probable that most of the equipment will be purchased in Japan, although where American or other foreign equipment is markedly lower in price it will probably be purchased.

Large sums of money have been put into this plant, to a total of probably Y. 45,000,000. The equipment was purchased at inflation-period prices. Great difficulties presented themselves at every step, and the experimental work has been costly. There is little chance of making pig iron at a profit if the works are carried at the present valuation. It has recently been reported that the book valuation has been reduced to Y. 20,000,000, a reduction of over 50 per cent. This action will put the plant more on its merits as an economical producer of iron. The company is determined to make a success of this enterprise and has a good chance of succeeding, although the works have never shown a profit to date. To make iron economically at this plant it is necessary to operate on a considerably larger scale, and the completion of the 500-ton furnace, and perhaps one additional 500-ton furnace after that, should make possible the production of pig iron at a profit.

Of course, one fundamental difficulty arises from the fact that the works are located outside of Japan and in the Japanese market its products are subject to the same handicaps of duty and freight as foreign pig iron. Production began in 1920, the tonnage turned out from these furnaces being shown in the following statement:

	Metric tons		Metric tons
1920	31,620	1924	94,501
1921	75,273	1925	88,241
1922	66,543	1926	145,936
1923	72,311	1927 (estimated)	203,000

Coking coal is supplied from the Fushun and Penhsihu collieries. The former mine, containing the enormous coal reserves of the South Manchuria Railway, does not provide coal of sufficiently good coking properties to use alone, but when mixed in the proportion of 80 per cent. Fushun coal and 20 per cent. Penhsihu coal a satisfactory coke is produced, although the ash content is high.

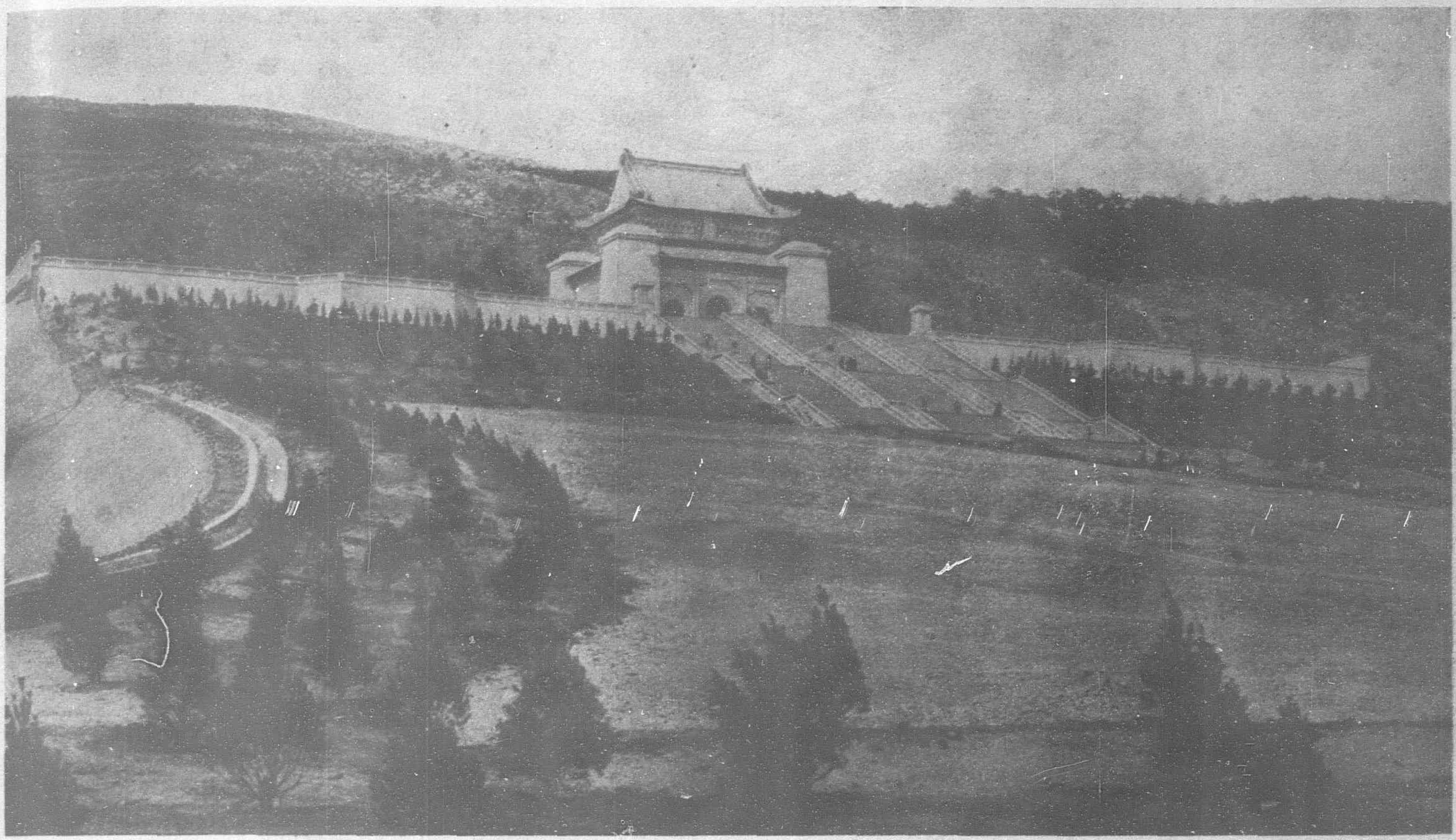
Other iron works.—In addition to the blast furnaces described, there are two other plants worthy of mention.

The Honkeiko Iron Works in Manchuria operates two 130-ton blast furnaces. The iron works, as well as the mines which supply the raw materials, are under Sino-Japanese management, but largely under the control of Okura & Co. Ores and good coking coal are found in the immediate vicinity of the works. The production is about 50,000 tons per year.

The Kamaishi Mining Co., in Iwate Prefecture, Honshu, has two 200-ton blast furnaces and one 60-ton furnace, with a combined rated capacity of about 165,000 tons per year. This is one of the oldest iron works in Japan and is located about 1 mile from the coast. It receives coal for coke making from Hokkaido and utilizes in great part its own ores obtained near by from the most important iron mine in Japan. The company is now under the control of the Mitsui interests, which are expanding the productive facilities and endeavoring to make the works a large and economical producer of pig iron. One of the 200-ton furnaces is now closed down for reconditioning and remodeling.

American Capital in Hokkaido

American capital in co-operation with Japanese is to develop the veneering business in Hokkaido. An American firm, whose name as given by the "Osaka Jiji" is unintelligible, will provide a factory in conjunction with Messrs. Takakuwa Ichiro & Co., Otaru, at Uotori-mura, outside Kushiro City. Mr. Montgomery, the American firm's expert, has just gone home after completing preliminary arrangements. The scheme gives the Japanese trade interests much concern, as it is understood to be formed in order to get all the materials available in Hokkaido and export the finished goods to the United States, securing the sole buying agency for the United States. The capital to work the scheme is fixed, it is reported, at a million yen.



General View of Dr. Sun Yat-sen's Mausoleum

New Buildings in Asia

THE Progressive Building Movement in the Orient is one of the most striking features of economic development which is taking place in the East to-day.

Nowhere in the world do modern structures harmonize beauty and utility to a greater degree than those projected and erected during recent years in port cities of Japan and China.

Among many modern buildings of which Tokyo can well be proud are her Marunouchi Building, the classic Mitsui Bank and the Mitsui Trust Building. In the design of these structures, the builders were confronted not only with all the usual problems which face the engineer and the architect but in addition, with the hazards from earthquake shocks. Scientifically designed foundations of the monolithic type, heavy, carefully strutted structural steel frame work and durable, fireproof materials throughout contribute for the protection of life and property in these buildings.

In the Mentetsu Hospital, Dairen boasts one of the most complete and modern institutions of its kind in the Orient, effectively equipped to meet every emergency by which surgeons and physicians are confronted.

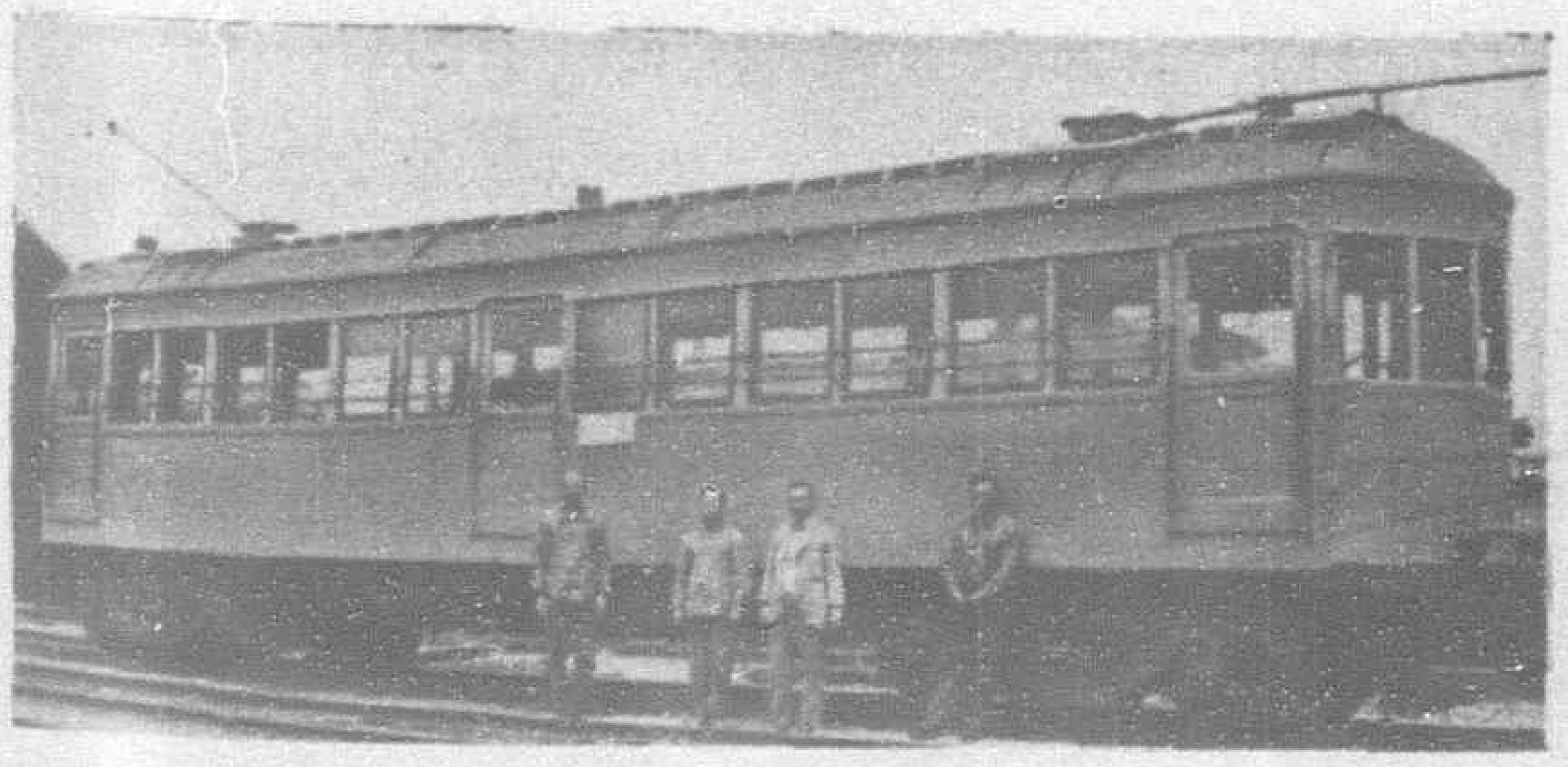
No less striking are the new Customs House Building, Sassoon House, and the Kincheng Bank Building in Shanghai which stand as tributes to the architects and engineers who planned and labored to bring these monuments into being.

Well deserved praise and admiration have been widely expressed for the impressive and majestic tomb of Dr. Sun Yat-sun in Nanking. This rare mausoleum that harmonizes the beauty of ancient and modern, makes sacred a spot to which millions of Chinese pilgrims will journey for many generations to come.

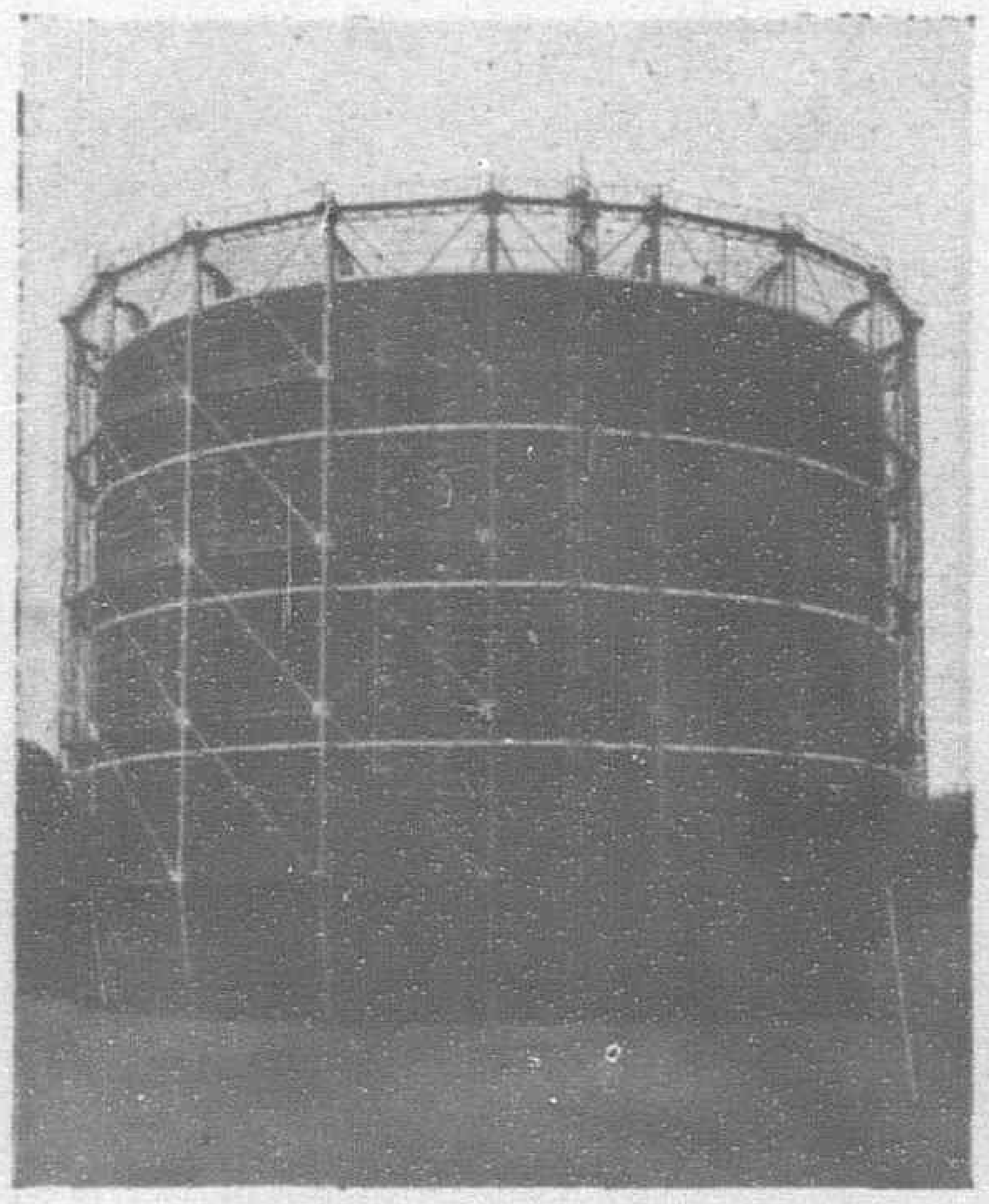
Each of these edifices expresses not only its own obvious beauty and utility but at the same time the technique and skill of those who designed and who contributed in the selection, assembly and erection of the materials which compose the united and finished creation.

In this age of specialization the engineer and the architect must be expert not only in the art of design and erection but familiar as well with specialized products which have been developed to meet each peculiar need and situation.

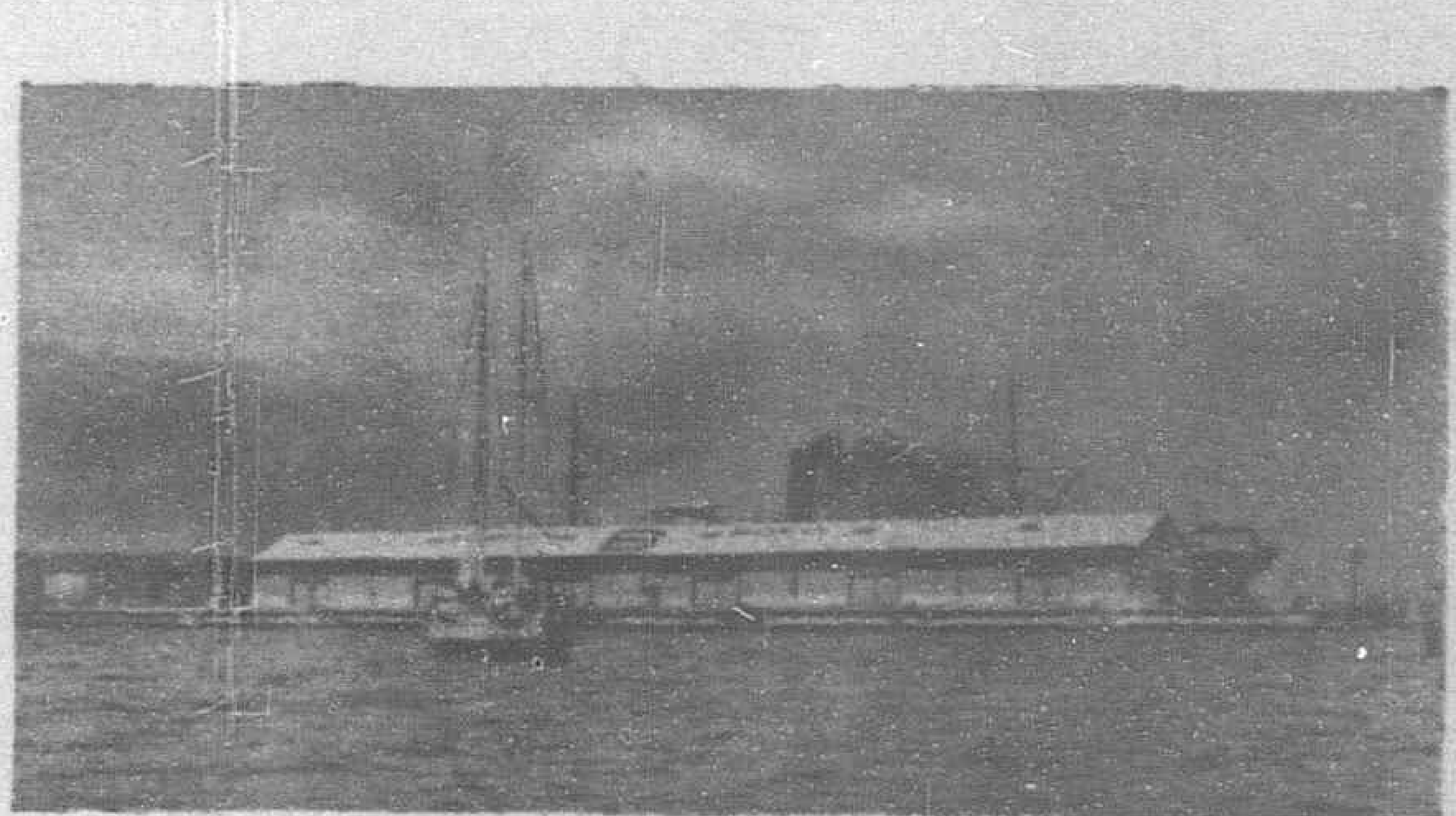
The choice of materials is a highly selective process requiring the best thought of the



Passenger Car, Osaka-Kobe: Compared with Steel with Armco Ingot Iron when inspected, the paint on Steel Panel had been peeled off noticeably over different parts of the plate, while the paint on Armco Ingot Iron has adhered uniformly until the inspection



Gas holder, Tokyo: Armco Ingot Iron Blue Annealed Plates used for the Crown and Armco Steel for the side



Warehouse, Kobe: The Siding of this newly-built shed is entirely covered with Armco Ingot Iron Galvanized Corrugated Sheets, 26 gauge, 8/3-in. by 72-in.

New Customs House, Shanghai

technician. In the selection of iron and steel alone many factors must be considered. For structurals in the frame work definite properties of strength are essential which are to be secured by specification of percentages of the elements—carbon and manganese with limitations in sulphur and phosphorus—specifications which have been found best when strength is the primary factor.

In metal furniture, doors, panels and interior finish work the requisite is for a high surface which will make a pleasing finished appearance.

In vaults and safes another type of steel must be used which has toughness to resist drilling and shock.

In heating and ventilating as well as in roofing and drainage systems, ductility and most important, rust resistance are factors which must be given careful consideration by the architect and the engineer in selection of galvanized sheets. Here again the progressive technician logically specifies that material which has a proved durability in combatting rust. For these applications authorities commonly select Armco Ingot Iron in which rust promoting impurities are reduced to one sixth of one per cent. In fact this pure iron has been used in many of the above mentioned buildings.

The cost and seriousness of rust have been brought to light most strikingly by Sir Robert A. Hadfield, one of England's most noted metallurgists. Dr. Hadfield has estimated that, "The amount of iron and steel which goes out of use each year because of corrosion is about equivalent to the total production of new metal in 1921." This means that rust destroys annually the staggering sum of 30,000,000 tons of iron and steel—a complete loss to industry.

As this eminent scientist has pointed out, there is only one solution of this problem, namely, the production and use of more durable iron.

Fifty years ago the world began to lean on iron as the basis of modern civilization. At that time it was laboriously made, worked and reworked by patient hand processes and it served well the needs of progress.

This iron was an aristocratic metal. Its services were only obtained at a high cost, but it repaid its users with a value that has become apparent in the years that have passed.

Examples of that splendidly made iron are still on duty at the posts to which they were assigned generations ago. Where they served, industry obtained the most satisfactory and low priced service that any board of directors and cost accountants could ask.

The invention in 1856 of a revolutionary means of making steel—the Bessemer Converter—was expected to sound the death knell of iron. The new steel had greater tensile strength than iron. It was made more rapidly, and in larger quantities and therefore, was cheaper.

It is not strange that under these circumstances, users turned their back on iron and greeted the newcomer with eagerness and confidence. Altho steel met the strength tests that iron had borne, it failed to stand the attack of corrosion as its predecessor had done. Not until about 1900, however, was there a general appreciation of this weakness of steel. A doubt then was born in the minds of many engineers as to the wisdom of deserting the old favorite—iron.

Engineers and architects realized that steel served best where heavy physical loads must be carried. But they could not forget the old-fashioned durable iron when they needed to combat rust.

The iron-making art, however, had dwindled. Very little iron was to be found. A few wrought iron makers here and there were still carrying on ; but these producers were in general unable to supply the quantities and sizes demanded by larger engineering projects.

Just at this time, new processes were developed whereby it was possible to make pure iron in an open hearth furnace and at a price comparable with that of steel. The new method of making iron has been adopted by associated producers in the leading iron and steel countries. All products formerly made of steel can now be made in adequate sizes and quantities in almost every conceivable form, ranging from nails to gas holders.

Again ships built of durable iron may part the waters of the ocean—Again iron roofing protects man and materials from sun and storm. Iron Railway equipment is again available. Iron pipe lines bring drinking water overland to supply great cities.

Just as definite percentages of manganese and carbon are specified for structural strength, so that progressive engineer and architect specify pure iron to minimize the damages and costs of rust in present day enterprise.

Sassoon Building, Shanghai

An Opinion on the Safest and Least Expensive Foundation Piling Adapted to Shanghai Conditions

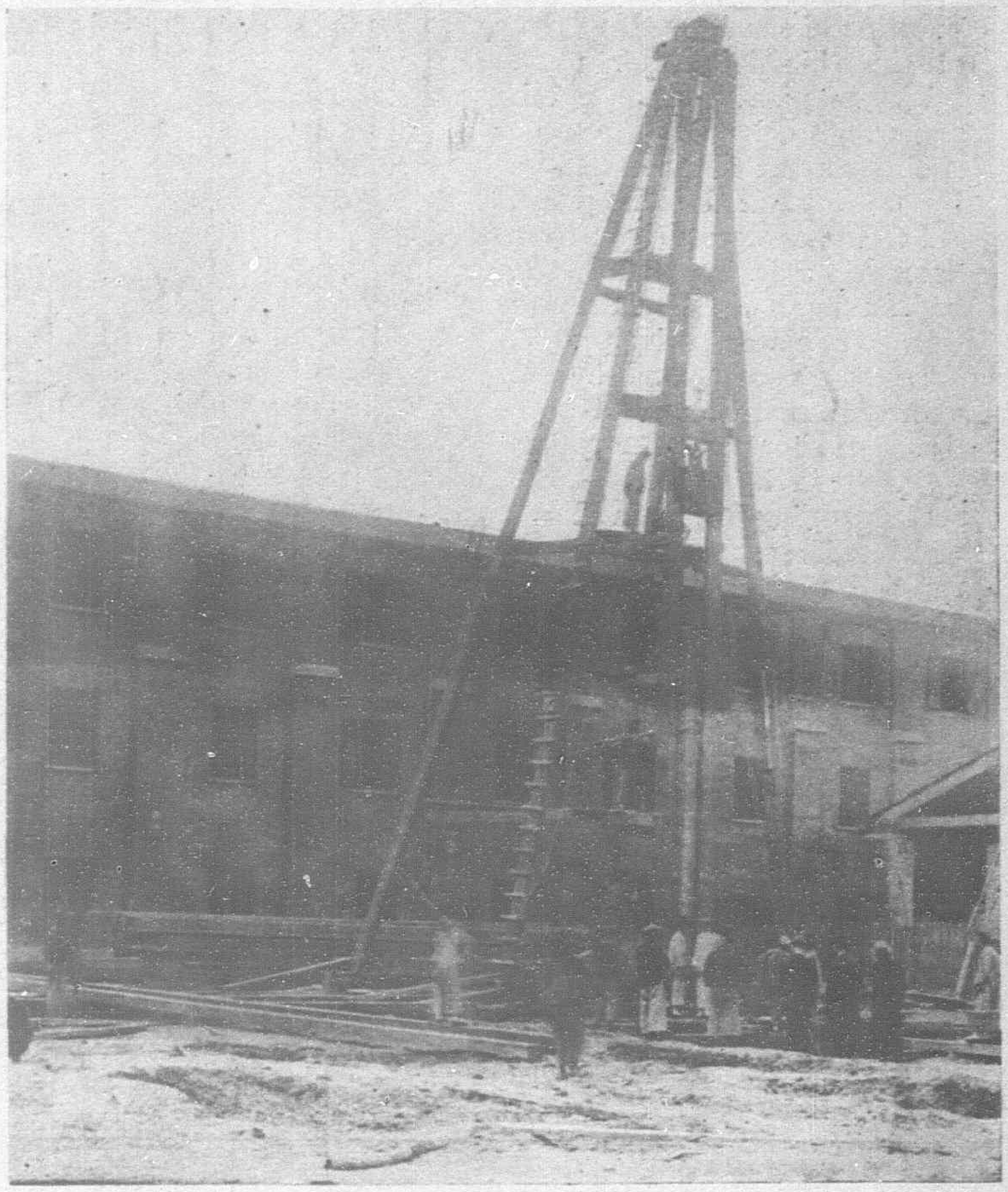
By E. J. Muller, M.AM.SOC.C.E.

Presented to the Engineering Society of China by the Author, 1929

In Shanghai, several years ago, when the "Hankow Pole" and "Foochow Pole" became too expensive to use as piling, whenever long piles were necessary, ordinary square Oregon Pine timber, 10-in. by 10-in., 12-in. by 12-in., and 14-in. by 14-in., often of great length, was and is still used by Civil Engineers and Architects.

In order to increase the friction area of this type of pile, various methods have been employed, including the writer's very simple and inexpensive method, *viz.* by having the 12-in. by 12-in. timber sawn in two, longitudinally, thus obtaining an increase of 50 per cent. of friction area on the same quantity of timber. Each pile then became 12-in. by 6-in., and even up to a length of 50-ft., there was never any difficulty experienced in driving such piles.

The cost of sawing a 12-in. by 12-in. stick into two pieces 12-in. by 6-in., including the extra labor in handling two instead of one, is about Tls. 1.00 per pile of 12-in. by 6-in., and the cost of driving a pile 12-in. by 6-in. say 50-ft. long is about Tls. 5.00.



Driving Test Piles

A 12-in. by 12-in. by 50-ft.-0-in. Oregon Pine timber brought to the building site costs Tls. 40.00 (with Oregon Pine at Tls. 66.00 per 1,000-ft. B.M.) and the driving Tls. 8.00, total Tls. 48.00. The Shanghai Municipal Building Rules allow a safe skinfriction of 225 lbs. per square foot for this kind of pile, and the safe carrying capacity of such a pile is therefore; 4 by 50 by 225=45,000 lbs.=22.5 short tons. Consequently such piling costs $\frac{48}{22.5}$ =Tls. 2.14 per short ton carried.

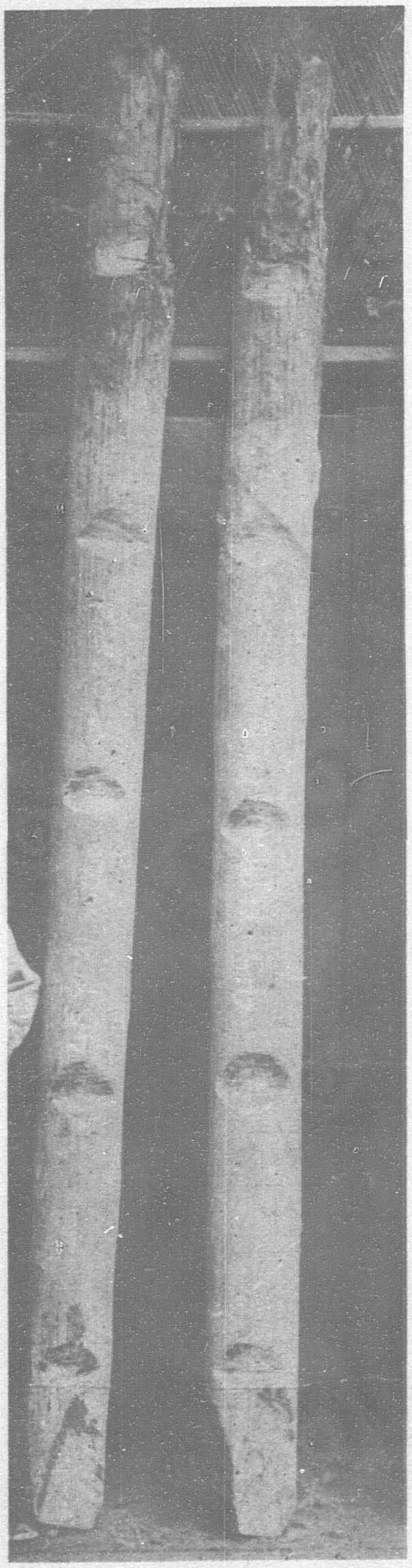
If a 12-in. by 12-in. timber is sawn in two, each 12-in. by 6-in. by 50-ft. pile costs Tls. 20.00 plus Tls. 1.00 plus Tls. 5.00=Tls. 26.00 driven. The friction area on one pile is 3 by 50=150 sq. ft. and the safe carrying capacity is therefore: 150 by 225=33,750 lbs.=16.87 short tons. Consequently such piling costs $\frac{26}{16.87}$=Tls. 1.54 per short ton carried. This means a saving of Tls. 2.14 less Tls. 1.54=Tl. 0.60 per short ton.

TABLE "C."—Comparison between Different types of Piling in Shanghai.

	TYPE	Section		Length Feet	Friction Area	Max. Skinfriction	Carrying Capacity		Cost in Taels		Approx. time in minutes driving one pile
		Shape	Dim.			allowed by S.M.C.	lbs.	short tons	per pile in ground	per short ton carried	
Concrete	Concrete Pile cast "in situ"	◎	18″-30″	30	234-ft.	350 lbs.	60000	30	120-150	4.0-5.0	360
	do. precast, parallel	□	12″×12″	50	200	225	37500	18.75	72	3.73	50
	do. precast, tapering	⊠	15″×15″ 6″×6″	50	175	350	55250	27.62	62	2.17	75
Wood.	Oregon Pine, parallel	□	12″×12″	50	200	225	45000	22.50	48	2.13	30
	Douglas Fir, tapering	◎	6″-10″	50	100	350	35000	17.50	33.50	1.91	25
	Douglas Fir, tapering	◎	7″-12″	50	125	330	41250	20.50	34	1.66	30
	Oregon Pine, parallel	▯	12″×6″	50	150	225	33750	16.87	26	1.54	15
	Oregon Pine, wedgeshaped, tapering	◫	12″×9″ 12″×3″	50	150	$\frac{350+350+225}{3}=308$	46200	23	26	1.13	20

Weight of pile not included in "Carrying Capacity."

The writer used this method for many years but has lately come to the conclusion that by sawing the 12-in. by 12-in. timber diagonally instead of parallel, as before, the skinfriction and consequently the carrying capacity would be considerably increased. Such piles would be "Wedge" shaped, say 12-in. by 9-in. at the top and 12-in. by 3-in. at the bottom. There is no increase in cost over the 12-in. by 6-in. pile on account of the different way of sawing.



Piles, 8-in. Diameter, 12 Feet Long, Just as Strong and Sound as New, After 45 Years in the Ground. The Upper Two Feet were in Filling.

In order to settle the question of the allowable value of the skinfriction for these "Wedge piles," some specimens were driven at the same site as several of the old 12-in. by 6-in. parallel sided type. All the piles were driven by a hammer weighing 5,500 lbs. and having a constant drop of 6-ft. They were driven 40-ft. into the ground, and loaded with broken stone up to 82,000 lbs. or 41 short tons per pile.

As will be seen from the accompanying diagram "A" which shows the test results for two typical piles of each kind, the "Wedge" pile carried 82,000 lbs. equivalent to a skinfriction of about 684 lbs. per square foot, before it actually failed, whereas the old parallel pile failed at a load of only 54,000 lbs. equivalent to a skinfriction of 450 lbs. per square foot. This, however, is not of such importance as the very slight sinking which the "Wedge pile" shows in comparison with other piles. Naturally it is desirable to have a minimum of sinking for foundation piles under safe loading, and as will be seen from the accompanying diagram "B" the sinking under safe loading is far less for a "Wedge pile" than for any other kind of pile considered.

The whole procedure of driving the piles as well as the loading and observation of the corresponding sinking by levelling, was witnessed and checked by a representative of the Public Works Department of the Shanghai Municipal Council. The Public Works Department now allows a "Safe Skinfriction" (Unit Load) for these 12-in. by 9-in. by 3-in. "Wedge Piles" of 350 lbs. per square foot of the inclined area, with a minimum slope of 1 per cent. for both sides, that is, the two sides 12-in. wide, from top to bottom, and 225 lbs. for the vertical tapering area, that is 9-in. wide at top and 3-in. wide at the bottom equivalent to an average safe skinfriction of

$$\frac{(2 \text{ by } 350) \text{ plus } 225}{3} = 308 \text{ lbs. per sq. foot on the whole area.}$$

The writer understands that the Public Works Department will carry out some further research work in connection with

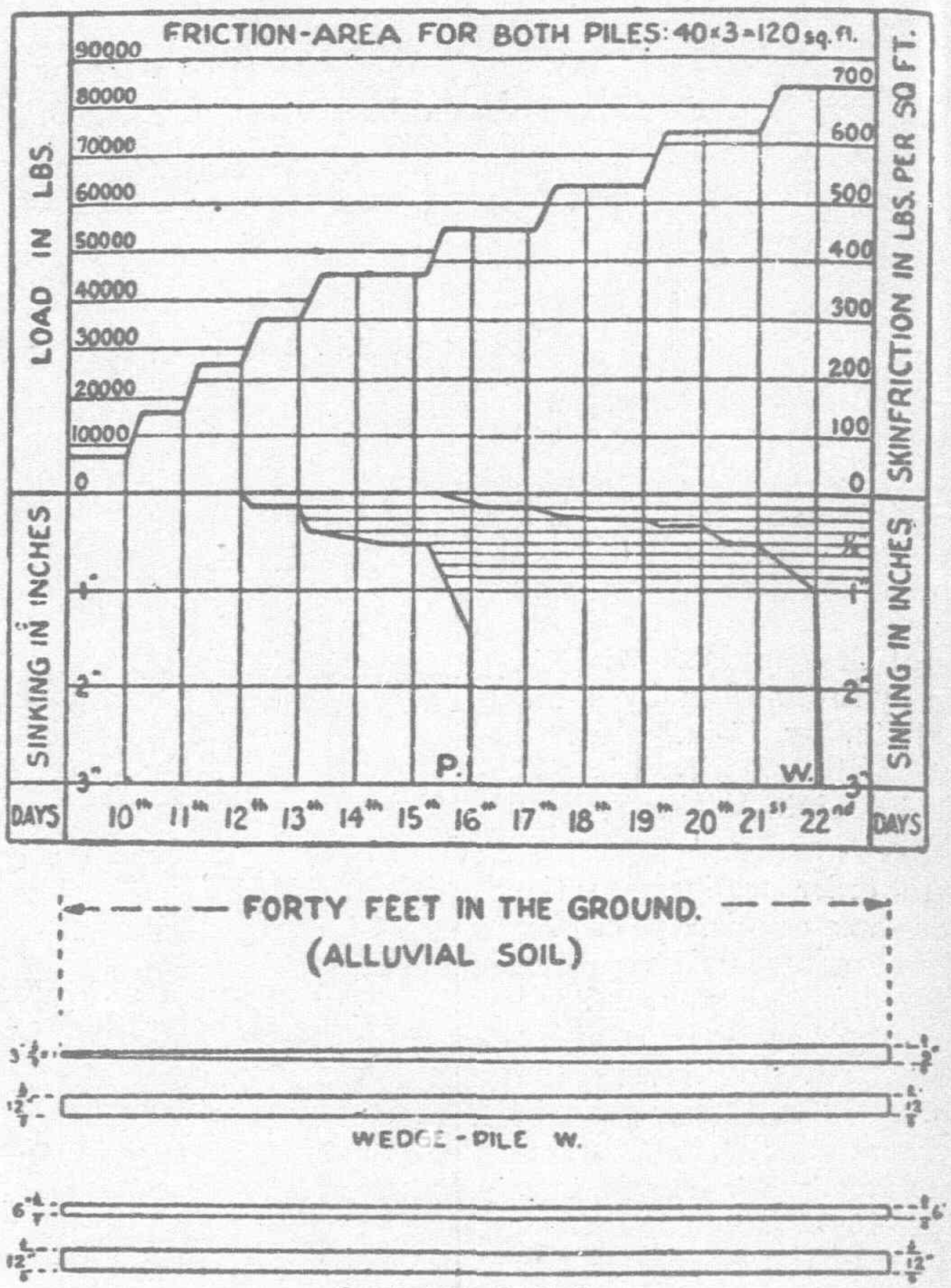


Diagram A.—Shewing Load, Sinking and Corresponding Skinfriction for one "Parallel-Pile" P. 12-in. by 6-in. by 40-ft. and one "Wedge-Pile:" W. 12-in. by 9-in.. 12-in. by 3-in. by 40-ft.

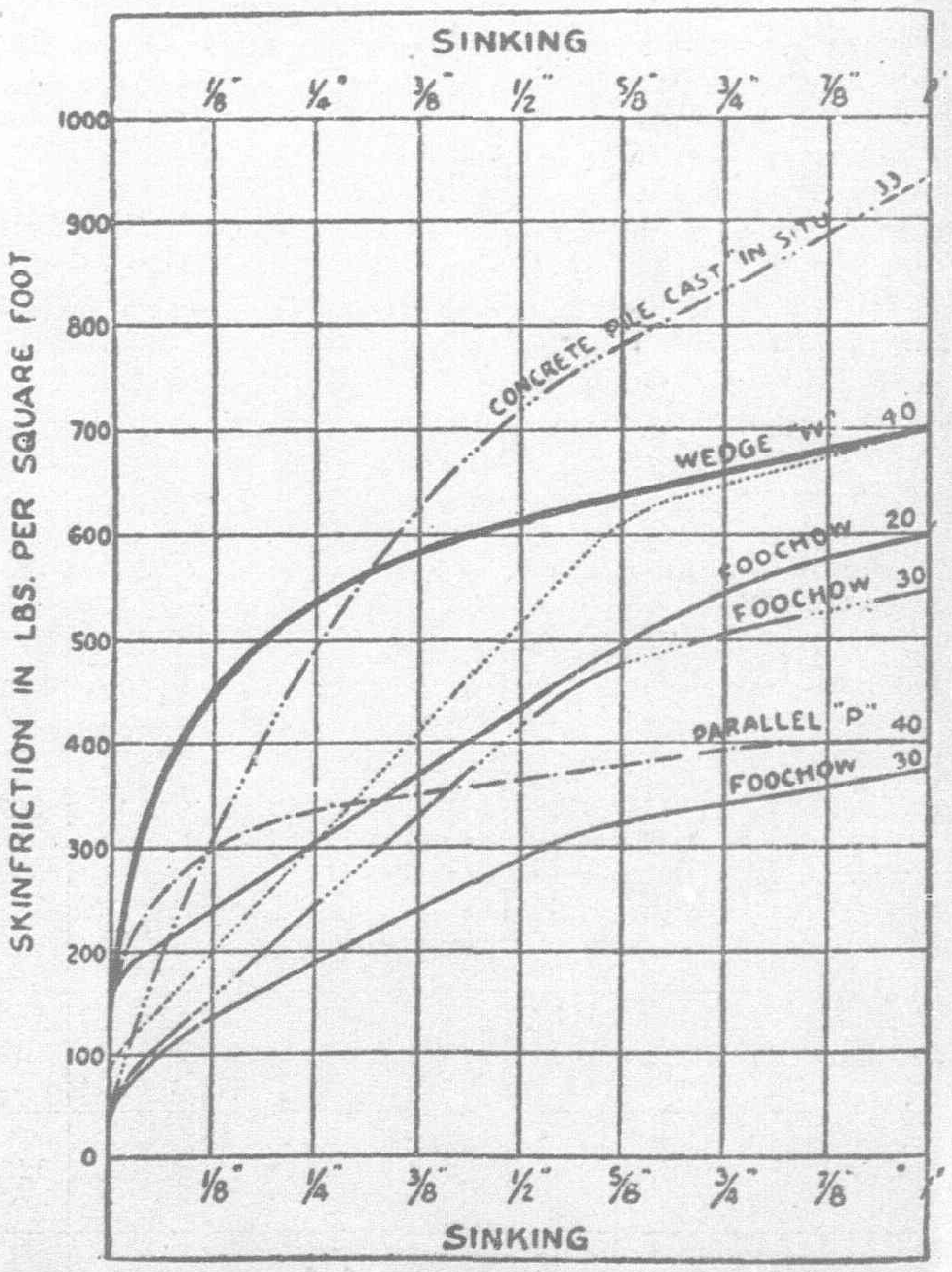
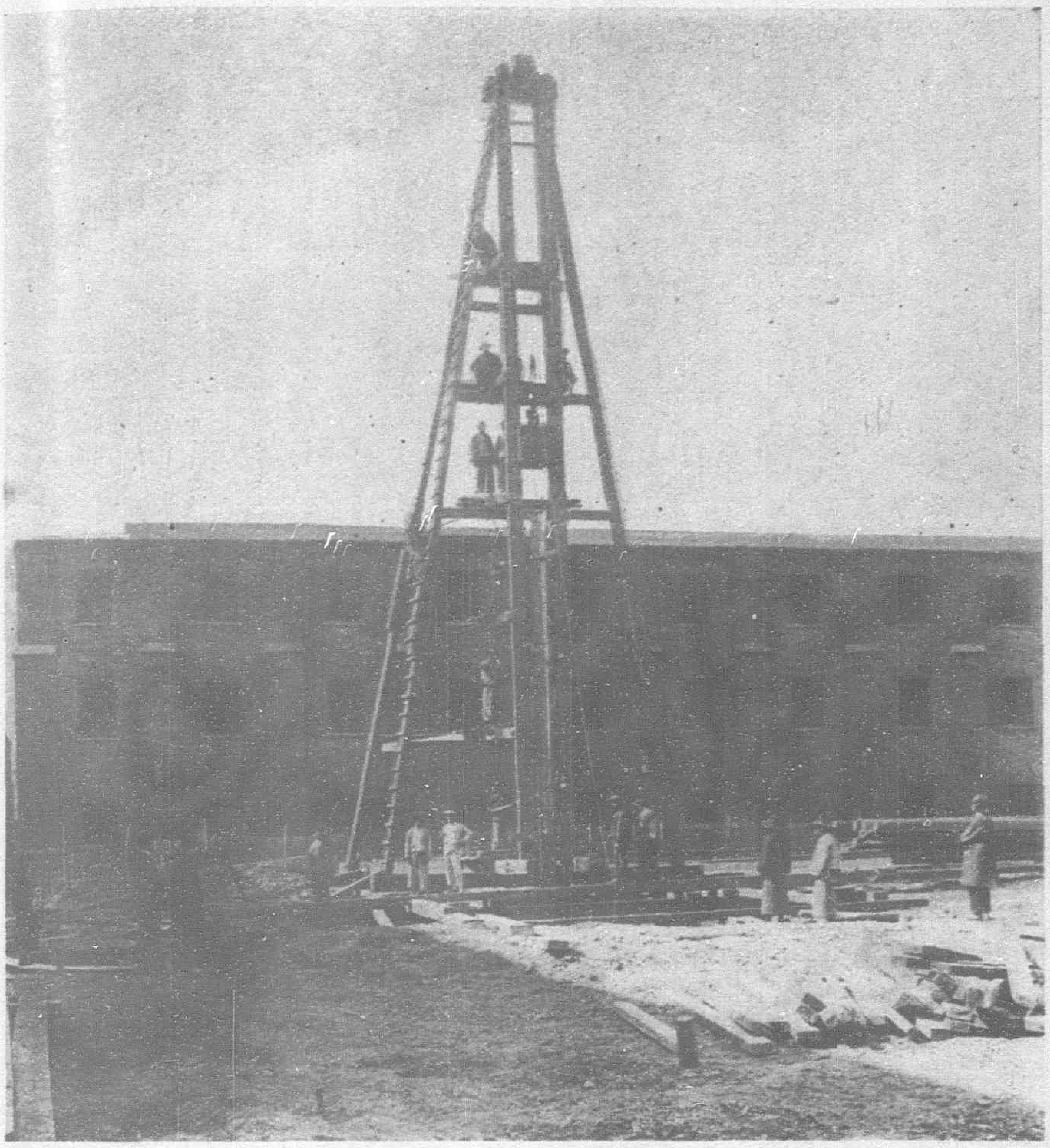


Diagram B.—Shewing the Sinking Corresponding to Skinfriction Plotted for:

Cast "In Situ" Concrete Piles.	**from**	**Published**	**Diagram**	
Foochow Pole Timber	**"**	**"**	**W. C. B.'s**	
Wedge	**"**	**"**	**"**	**Observations**
Parallel	**"**	**"**	**"**	**"**



Driving Test Piles

"Wedge Pile" and as a result no doubt the "Safe Skinfriction" (or Unit Load) will be considerably increased. Thus, a "Wedge pile," 12-in. by 9-in. and 12-in. by 3-in., 50-ft. long will have a safe carrying capacity of: 3 by 50 by 308=46,200 lbs.=23 short tons, and as this pile costs the same as the parallel 12-in. by 6-in. by 50-ft. 0-in. pile (see above), *viz.* Tls. 26.00 driven, it will cost: $\frac{26}{23}$=Tls. 1.13 per short ton carried. This means a saving of 2.14—1.13=say Tls. 1.00 per short ton as compared with the ordinary 12-in. by 12-in. piling which is now still much used in Shanghai.

For an ordinary building, such as a four storied godown of say 170 by 120-ft., of Reinforced Concrete with Floor Loads of 400 lbs. per square foot, the total load to be carried is about 20,000 short tons. When piles are used, the foundation soil area never immediately carries any load directly, all loads being taken first by the piles only. If and when they fail, then the soil is compressed until a condition of equilibrium occurs. The total load must therefore always be carried by the piles only if sinking is to be minimized; and for the building in question:

the cost of 12-in. by 12-in. parallel piling would be: 2.14 by 20,000 =Tls. 42,800
and for 6-in. by 12-in. parallel piling: 1.54 by 20,000=Tls. 30,800
and for 9-in. by 12-in.—3-in. by 12-in. (Wedge): 1.13 by 20,000=Tls. 22,600

This means a saving of Tls. 42,800—22,600=Tls. 20,200 for an ordinary godown.

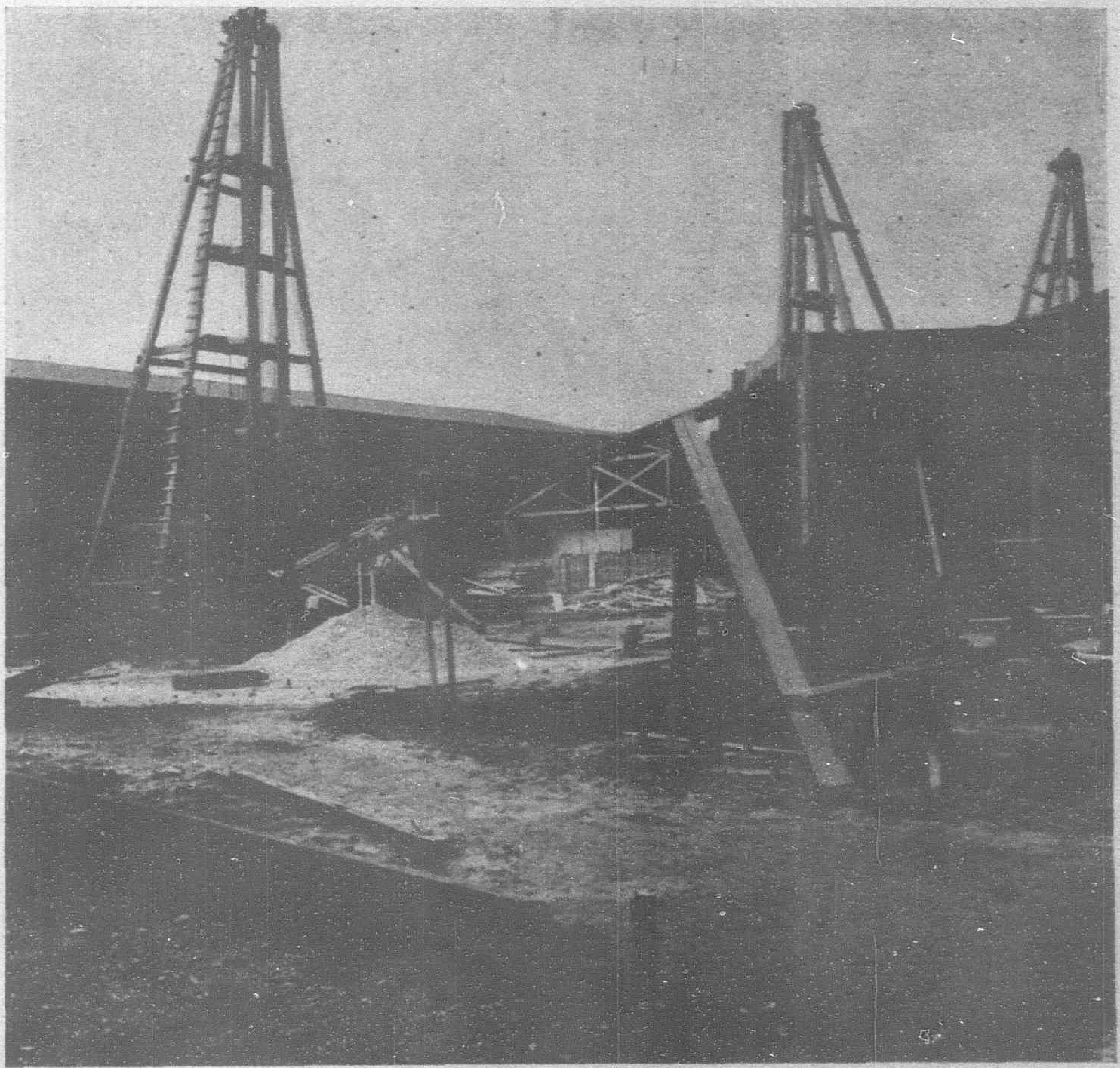
Table "C" shows a comparison between different kinds of piling as regards carrying capacity and cost. For the building chosen in the above example, the saving in money if "Wedge piles" were used instead of "Cast in Situ" concrete piles would amount to about Tls. 60,000 to Tls. 80,000 and the time saved to about four to five months.

As many people are doubtful about the permanency of wooden piling in Shanghai, the writer takes this opportunity to state that wooden piles 12-ft. long 8-in. diameter, were withdrawn recently from the foundations of a godown 45 years old which was demolished to give place for a modern reinforced concrete structure. The floor level of the old godown was about two feet above the surrounding area and adjoining street. The outer inch of the upper most two feet of the old piles had been destroyed but the 6-in. core was sound, as was the whole remaining length of the pile, just as sound as if it had been driven at the present time. This shows again that timber piles in the moist soil of Shanghai will outlive any structure they carry. There is therefore no reason whatever for wasting money in Concrete piling in ordinary cases. Under any circumstances, the "pre-cast" Concrete Pile, if made *wedge-like* on all sides, (as a slender pyramid) will be far cheaper than the Concrete Pile cast "in Situ," in fact it is nearly as cheap as the parallel 12-in. by 12-in. Oregon Pine Pile, (as will be seen from Table "C" p. 7). Further the casting and driving of a Pre-cast pile can be easily controlled, and its reliability depends very much less on any inspector's attention to duty, than is the case with piles cast "in Situ."

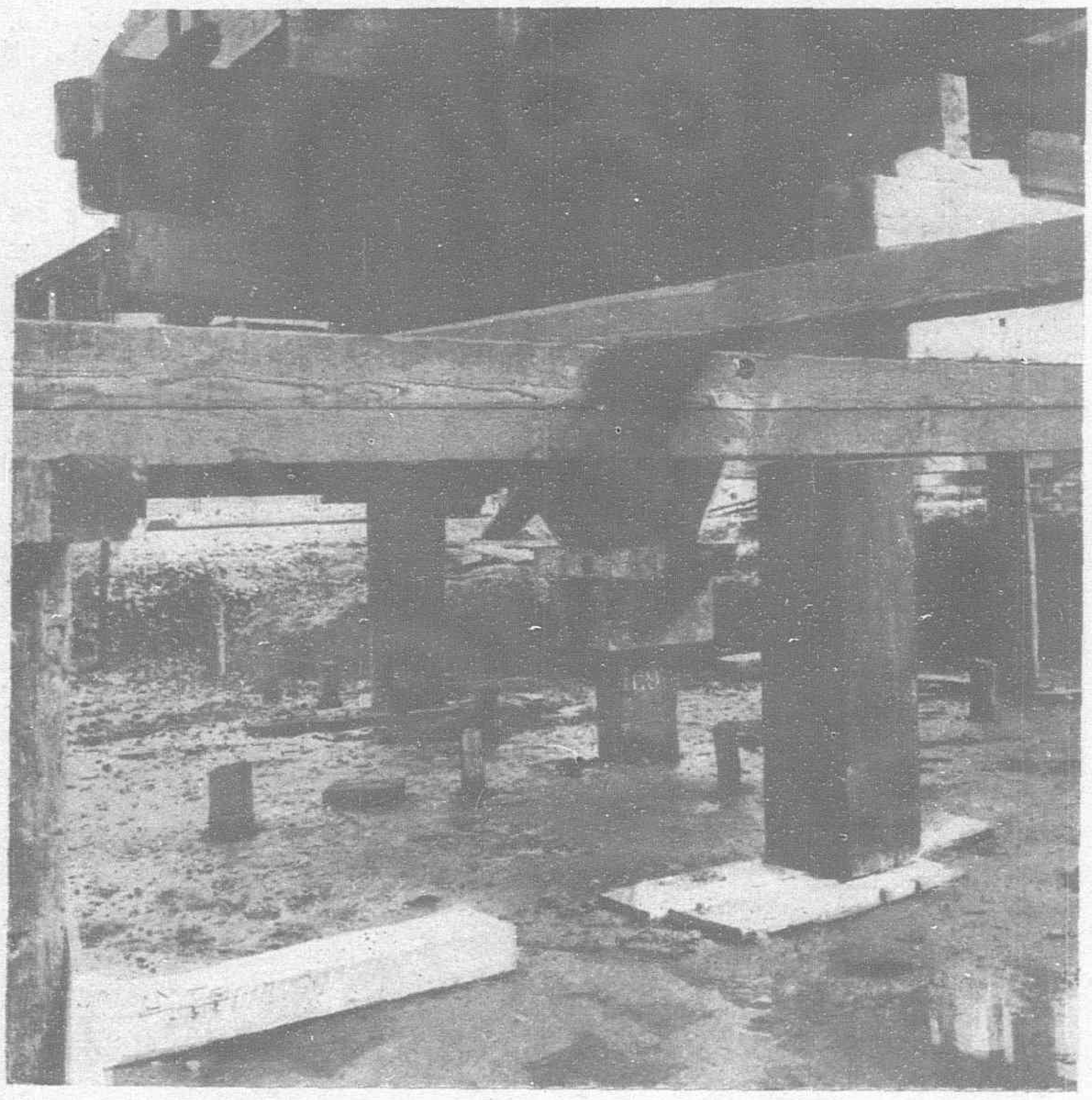
Recently the writer had 1,450 Oregon Pine Wedge Piles 38-ft. long driven in 20 days with three pile drivers, with a maximum total of 103 in one day, or a maximum of 35 piles driven with one pile driver in one day.

As a point of interest it may be mentioned that these Oregon Pile "Wedge Piles" rose from 3 up to 12 inches when adjacent piles in a foundation pit were driven (a greater value than usual).

These "Wedge Piles" also utilize the more compact upper layers of the soil better than "parallel piles," as the greater friction area is at the top.



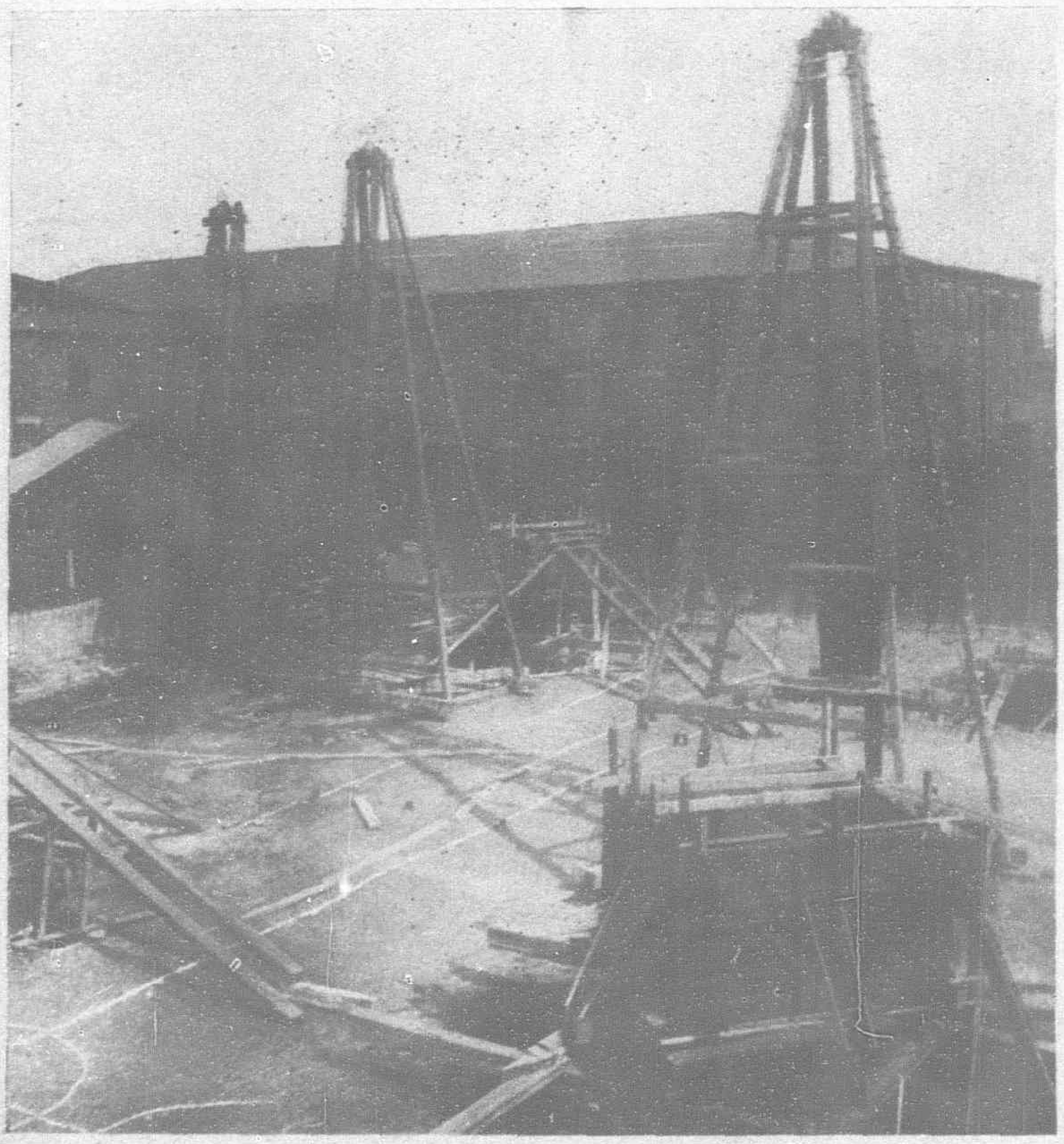
Loading Up Test Piles



**Measuring Sinking or Penetration of Piles and Possible Movement of Adjacent Ground in Pit
Measurements Taken by Levelling Instrument and also Pianowires Strung Across Pit**

In addition to the absolute superiority in Shanghai of the Oregon Pile Wedge Pile over all other usual types as regards cost and time, there is also the safety one may be assured of when using them. That type of Concrete Pile, cast " in Situ " which does not utilize a shell left in the ground into which the concrete is tamped, will always run the risk of having the mud penetrate into the concrete during the tamping, unless extreme care is taken. The consistency of the Shanghai soil is such in many places as to raise the question of the safety of cast " in Situ " piles of this class. Experience shows that such piles frequently are of no use as a support. In many cases in New York for instance, soft mud entered the concrete and formed a layer between the deposits, thus absolutely destroying the carrying capacity of the piles. In Germany also there have been several cases similar to that mentioned above. When this happens in such countries, what can be expected here, where very strict inspection is necessary even for the simplest kind of work ? It may therefore be somewhat risky to use such piles, in Shanghai. Piles of this type have been offered to intending builders, purporting to carry a load twice that stated as safe in Table " C," which means a skinfriction of 700 lbs. or more. To figure with such loads in Shanghai is, in the opinion of the writer, not safe and good practice.†

The great carrying capacity of wedge-shaped piles has been known for many years of course, but the writer thought that the idea of sawing diagonally in two the ordinary 12-in. by 12-in. Oregon Pine Pile, so commonly used in Shanghai, and so obtaining a great saving by very small means, would be of interest to the building public as well as to Civil Engineers and Architects.



Testing and Driving Wedge Piles

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†See " Concrete. Plain and Reinforced" Taylor, Thompson and Smulsky Vol. I. p. 559. Fourth Edition 1925.

Singapore's New Water Supply

ON Gunong Pulai, a mountain in south Johore which was practically unexplored four years ago, a large gathering on Sunday afternoon saw an important event in the municipal history of Singapore—the opening of the Sultan Ibrahim Reservoir.

This reservoir forms the first instalment of the Gunong Pulai scheme for increasing the water resources of Singapore. It collects the water from two streams draining catchment areas totalling 1,980 acres. A second reservoir draining an area of 3,000 acres is now being constructed at Pontain Kechil, three and a half miles away, and the third instalment, which will be left undeveloped until required, provides for the draining of an area of 490 acres. It is expected that the two reservoirs, together with the existing island supplies, will be sufficient for the next twenty years.

Mr. Farrer, President of the Singapore Municipal Commissioners said that the programme of works on Gunong Pulai consisted of that reservoir, the main dam, a smaller dam, and a tunnel leading to the neighboring valley. There was also the pipe-line to Singapore, the filter beds, which were not quite completed, and the service reservoir on Fort Canning Hill. These works, with the exception of the pipe-line, had all been constructed by what was known as direct administration, and the justification for that policy was shown by the fact that the works had been completed for $800,000 less than the estimate. They had to congratulate Messrs. Sir Alexander Binnie, Son and Deacon, their consulting engineers, who had designed these works and selected the staff, and to express their thanks to the Chief Resident Engineers, Colonel H. L. Pearson and Mr. G. B. Gifford Hull, who had speeded up the construction of the dam in order to meet the needs of the town, the water position not being as satisfactory as could be wished.

They also had to thank Mr. Jackson, who had been in charge of the work at the dam since the first bucket of concrete had been poured in and who, with his assistants, had worked unduly long hours in order to fulfil the consulting engineers' wishes that the Commissioners should have the use of the reservoir as early as possible. The reservoir had been handed over to the Municipal Water Engineer a few days ago and it would add six and a half million gallons a day to the town's supply, making a total of eleven millions. He should not forget to mention the services of Mr. B. I. Chambers, resident engineer for most of the pipe-line and the Fort Canning reservoir, which works had been done with great speed and most economically.

They started with a labor force of one thousand men, and they provided a hospital with sixty beds. Within a year fifty beds had been converted into dwelling accommodation and the remaining ten had never all been occupied at the same time. They were proud of this work, and proud of the saving in health and human life which had resulted.

Adoption of Automatic Couplers on Japanese Railways

On October 29, 1923, the International Labor Conference, adopted a resolution which runs as follows:

> "The Fifth Session of the International Labor Conference, considering the importance for the safety of railway workers of the question relating to automatic couplings, requests the Governing Body to obtain information from Governments and international technical and industrial organizations upon the question of automatic couplings, in order to decide whether an international agreement in the matter is desirable in the interest of the workers."

Japan had the honor to be the first country to carry out the idea expressed in this humanitarian resolution, converting the coupling on her whole system of railways into the automatic type in 1925.

The Japanese railways had used screw and link couplings since the construction of the first line in 1872, with the exception of the Sapporo Region, *i.e.*, the lines in the Island of Hokkaido, which had adopted automatic couplers of the American type. The idea of adopting the automatic couplers on the other lines came to some engineers of the Japanese Government Railways shortly after the nationalization of railways in Japan which took place in 1906; but, as such a work naturally required many years of careful consideration and investigation, it was not until 1918 that effective steps were taken by the decision of the Government, and the final work of changing took place in July, 1925.

Preparatory Work

In order to find out the most practical design and changing process, as well as to investigate the expense and time required, eight designs were tried on some representative freight cars at the Oi Works (in the vicinity of Tokyo), in August, 1917.

The preparatory work was commenced in 1918 and completed in the spring of 1925, having been performed in three stages.

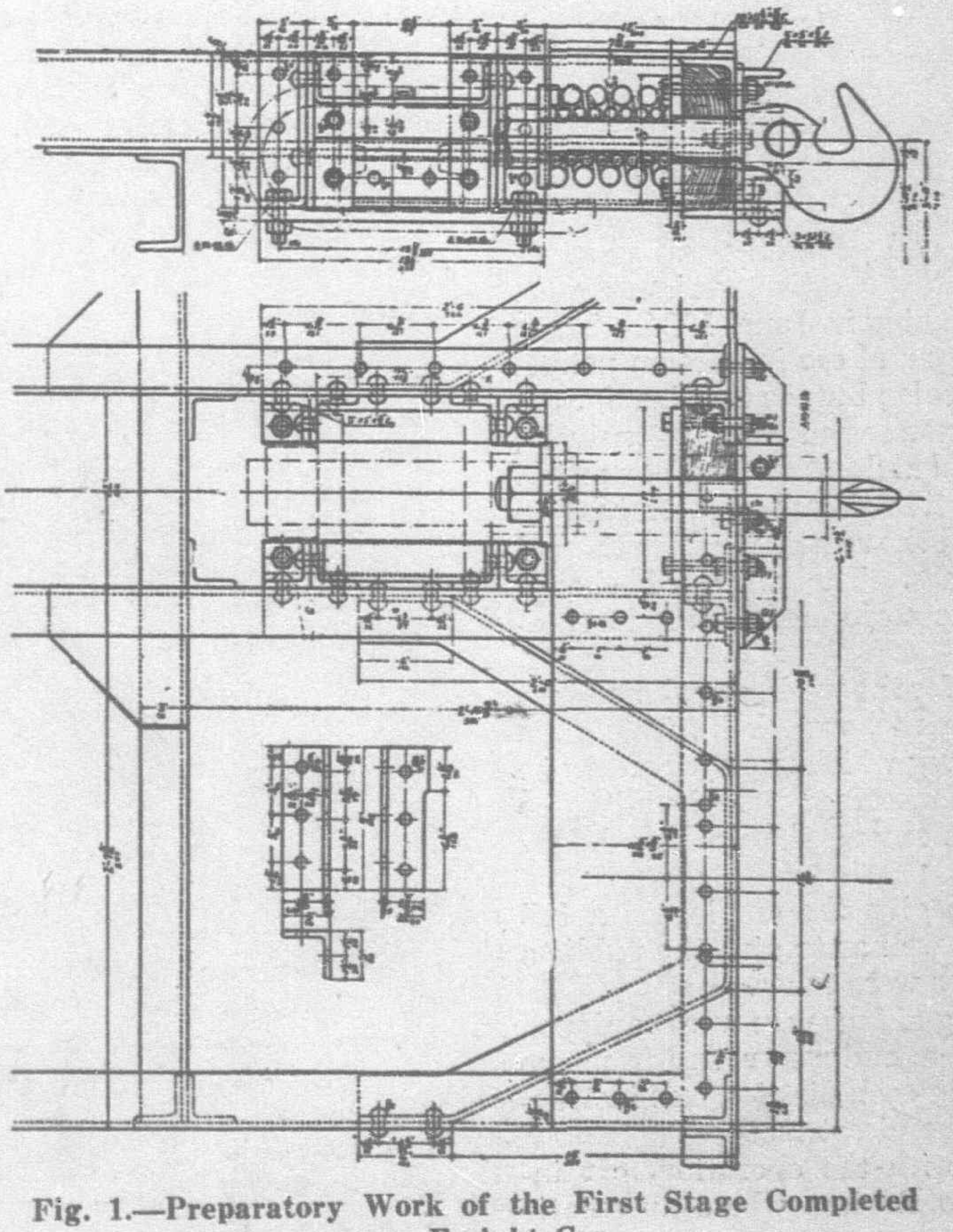


Fig. 1.—Preparatory Work of the First Stage Completed on a Freight Car

Planning and Organization of the Work

One of the most important factors in the making of the change was to see that the traffic should go on with as few interruptions as possible. It was decided to perform the work of the final change during the month of July. In Japan, the month of July is quite warm and, furthermore, the freight traffic is comparatively light. Many of the freight cars are withdrawn from service, and it was possible to apply the automatic couplers on those cars at any convenient time. The committee in charge of planning the work also took into consideration the fact that the days are quite long in July, and, as the preparatory work was completed in the spring of 1925, it was decided that the final work of changing be carried out on July 17.

July 15 and 16 being Buddhist holidays, it was estimated that the freight traffic would be especially light on the day after those holidays. This program was applied to all districts except the Kyushu District (the Island of Kyushu), where the final change was done on July 20. As the freight cars destined to and from the Main Island and the Island of Kyushu are carried on ferry boats, it was arranged to limit the number of freight cars transmitted between the Main and Kyushu Islands to the minimum requisite on those days, thus permitting of the calling of some working troops from Kyushu to the Main Island to aid in the work on July 17, and *vice versa* on July 20.

All of the plans for the preparatory work were made by the Mechanical Department of the Railway Ministry, and an Investigation Committee, with the Vice-Minister as Chairman, was formed at the Ministry to draw up a general plan for the changing Work.

Detailed plans were submitted by the Regional Executive Committee, formed at each Region Office, consisting of the chief of the operation section as chairman and both the chiefs of the mechanical and the transportation sections as vice-chairmen, some works managers, car-distributing agents, etc. On the receipt of each detailed plan, it was necessary to decide what factors were common to all the Regions, and, to solve this problem, a central executive sub-committee was nominated from the committee in the Ministry. This sub-committee, presided over by the chief of the operation section, met with the Regional Committees to work out all necessary arrangements.

The organization of the executive forces for carrying out the work was not identical in all of the Regions. Let us take as a typical example the organization of the Tokyo Region: the headquarters of the Region were located in the Region Head Office. On this Region ten district headquarters were established, the chief of each being either a district traffic officer or a works manager. There were 19 local headquarters under the control of the district headquarters, the chiefs of which were usually the leading engineers of the car repair shops. There were 54 working organizations usually with an assistant engineer at a repair shop as chief, destined for 50 changing stations. The crew of each working organization was divided into parties in charge of a foreman, and each party was divided again into gangs, consisting of from five to eight workmen. 19 gas-cutting gangs and 11 relief gangs were distributed among the various local headquarters. There were also 50 "settling" gangs under the jurisdiction of the local headquarters, one of which was assigned to each changing station. A station master was placed in charge of each of these settling gangs. The function of these gangs was to arrange the cars at the changing station as required, to prepare lodgings and meals for the working force, and to put aside the old couplings, buffers, etc. as soon as they were taken off the cars. The settling gang consisted of yardmen and employees other than shopmen. This system of organization as outlined above, proved to be quite satisfactory.

In planning the details of the organization, especially that

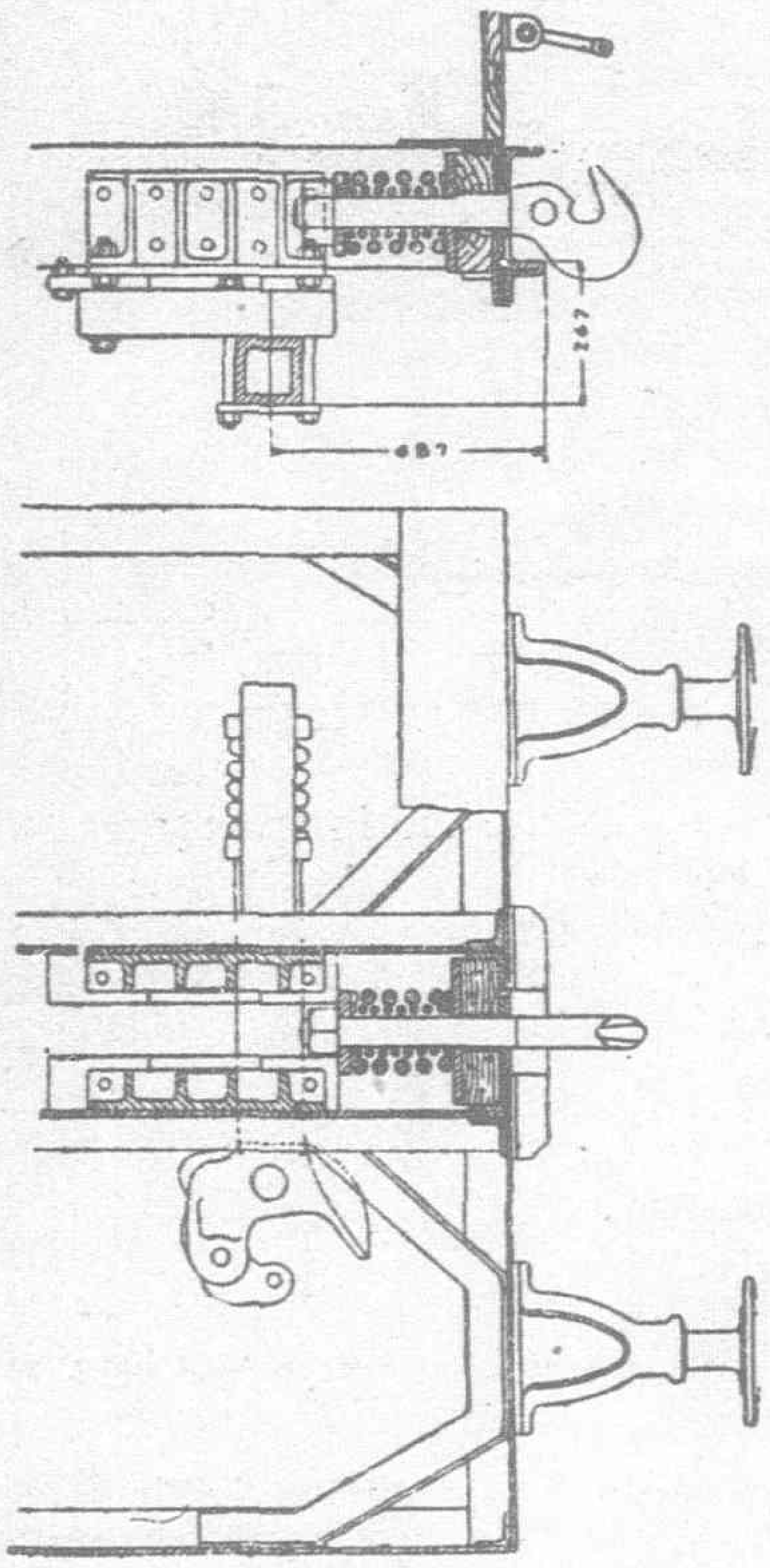


Fig. 2.—Suspension of the Automatic Coupler under the Centre Sills on a Freight Car.

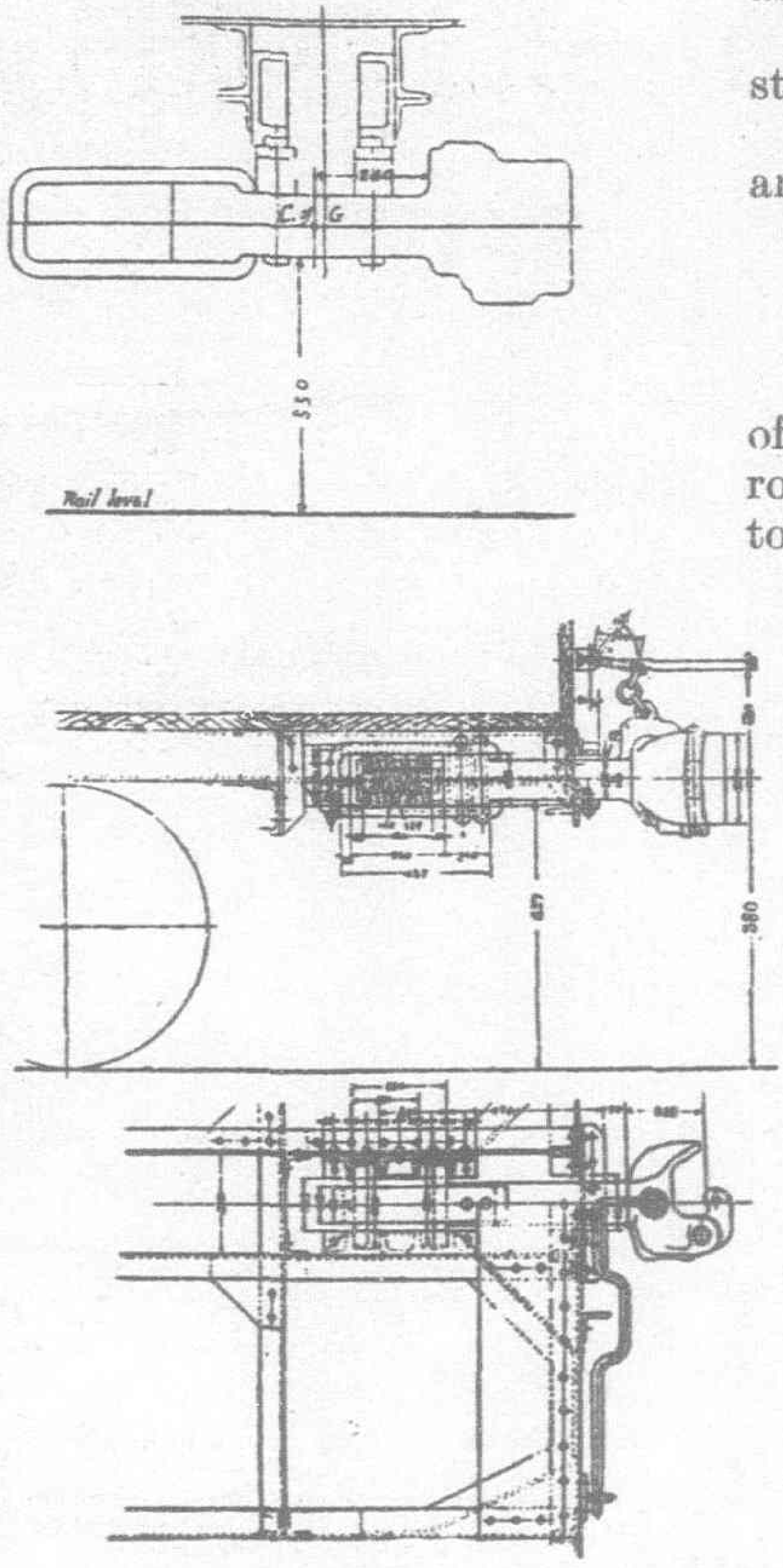


Fig. 3.—Changing of the Coupler Completed on a Freight Car.

of the working gang just described, it was deemed advisable to make a number of changing tests. In one of these tests, two skilled workmen changed the couplers of 10 cars in nine working hours. In another test, two unskilled workmen, who had had only one or two months' experience as workers in the shop and had practised the changing of couplers only three times, succeeded in changing the couplers of six cars in nine working hours. After repeated tests at several shops and car inspection points, we came to the conclusion that as a fair average we could count on about 3½ freight cars per workman a day, assuming that all classes of workmen were to be employed in making the change of couplers.

Exercises on Changing Couplers

The workmen at car repair shops had naturally had previous experience in the changing work; but the other workmen were given a series of training exercises beginning in June, 1924. These exercises were started at all of the shops and car inspection points. They were first done on a rather small scale; but, as the time for the change approached, the training was performed more intensively, so that eventually each workman had had at least one day's practice. Some of the workers at the car inspection points were trained to make the change on the freight cars, and the remainder were trained to make the change on passenger cars. The work of changing the couplers on the locomotives was performed by the locomotive shop repair men.

To make the working hands keener for the work, grand meetings of changing practice, just like tournaments, were held, from time to time, and prizes were given to the gang which were judged to be the most efficient at the work. Those meetings were found to be very effective, arousing intense interest among the working hands for the work.

As it was considered necessary to give the employees a full knowledge of the automatic coupler, as well as to give the public a general idea of it, the following measures were taken:

(1) In April, 1924, trains consisting of four cars were equipped with different types of automatic couplers and sent round from one station to another, one train being run in each district, and instruction being given to the employees by the direct method.

(2) In order to familiarize them with the operation, car inspectors, etc., were sent to the Sapporo Region, where automatic couplers had been used for 15 years.

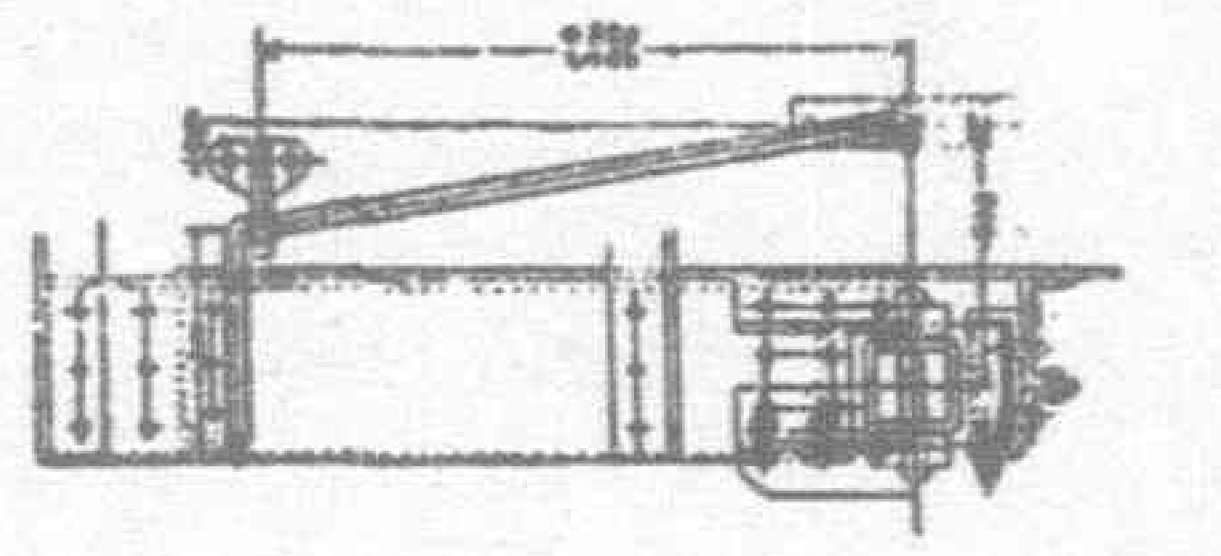
(3) Pamphlets and folders on the automatic coupler as well as on its handling were printed and distributed among the employees.

(4) Lectures on the same were given from time to time at the stations, etc.

(5) General attention was drawn to the new type of couplers and the changing work by means of posters and articles in periodicals.

Tools and Appliances

The tools and appliances used in completing the third stage of the preparatory work were the same as those used in the regular routine work of changing the couplers. The majority of these tools were not of standard design, being devised by a number of workmen and, of course, were not uniform throughout all the Regions. There were, however, two devices, namely, the jack for the coupler and the spanner for the drawbar nut which were standardized. These two devices, which are shown in Fig. 4 and Fig. 5, were the results of a design obtained by a public competition and were extensively used. The jack was a double threaded, double screw jack. The minimum height was 15¾-in. (400 mm.), so that it could be lowered to required height and be placed to receive the coupler, which was held under the centre sills of the car. The maximum height was 32½-in. (825 mm.), which was sufficient to jack the coupler up to its proper position between the draft sills. The spanner was designed to unscrew the drawbar nut while the automatic coupler was kept in the hanging position under the centre sills. Both of those tools are of light construction, easy to handle and cheaply made, because they were intended for temporary use only.



Changing the Couplers on the Passenger Cars and Locomotives

As above-mentioned, the coupler conversion of the freight cars was to be done on July 17, 1925, in order to interfere with the movement of freight traffic as little as possible. It was not necessary, however, to effect the changing of the couplers on the passenger cars at one time, because the passenger cars making up a train could be treated as one set and were seldom used in other trains. Thus the passenger cars in the service of regular trains were changed at a convenient time in the period between July 1 and July 10, except the couplers at each end of the train. The couplers on spare cars and the locomotive couplers were changed on July 16

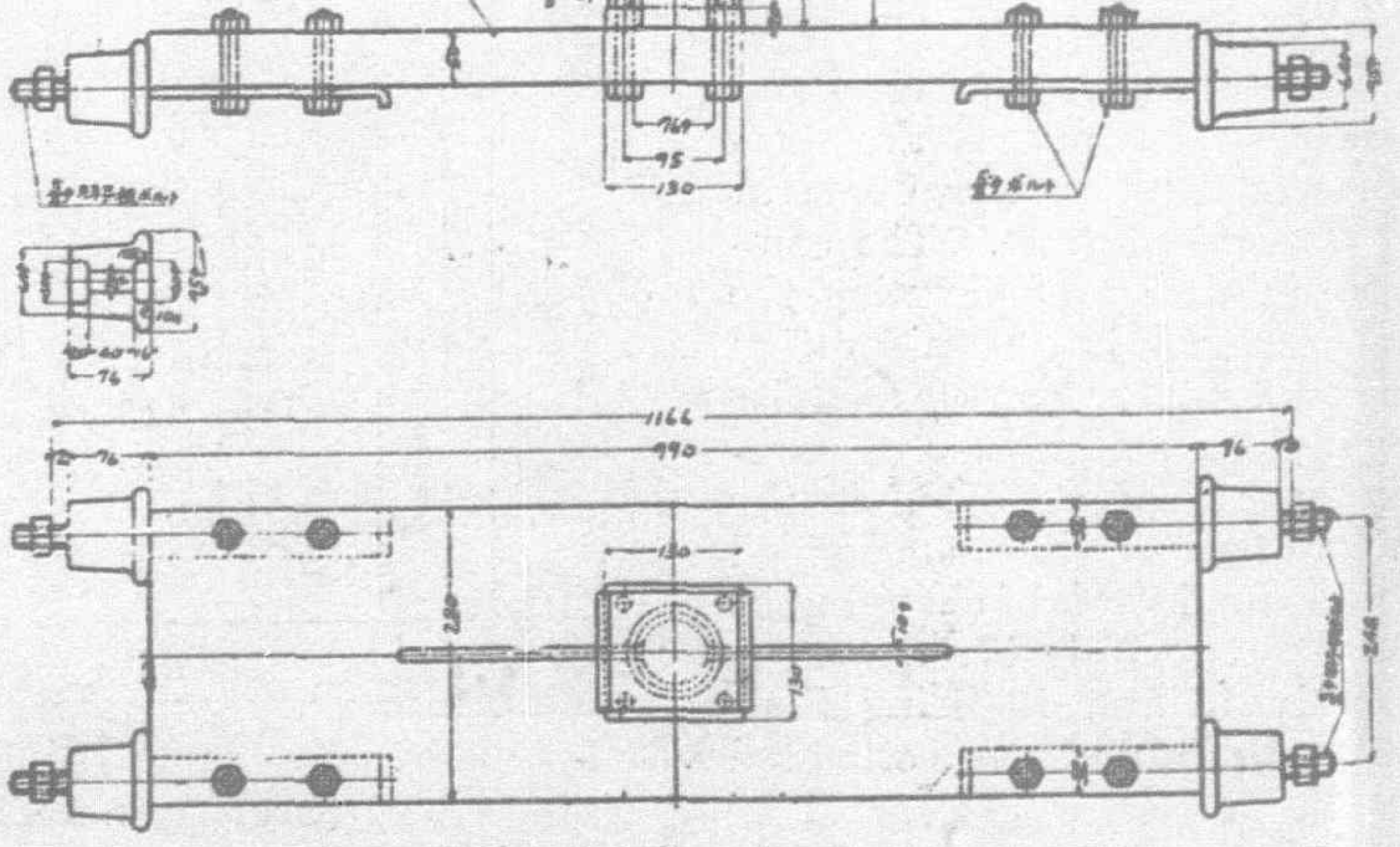


Fig. 4.—Coupler Jack.

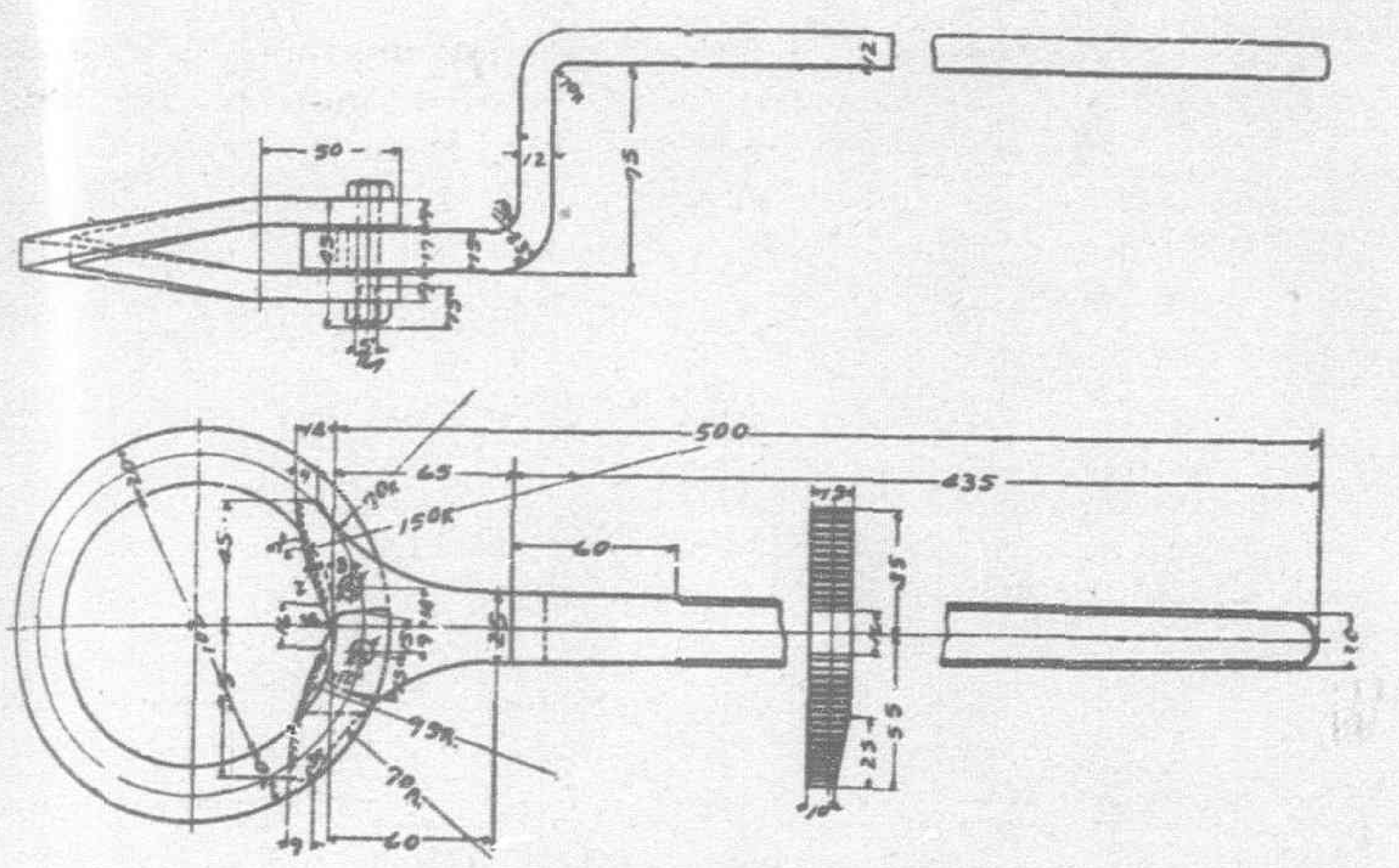


Fig. 5.—Drawbar Nut Spanner

and 17. This arrangement was carried out in all districts except the Kyushu district, where they were changed on July 19 and 20. For this purpose a certain arrangement as to transportation was made, for instance, the transportation of newspapers on the day of changing was done on a special schedule through previous consultation with the publishers. Parcels and party passengers were also limited by a public announcement made before the day of changing.

The changing of the couplers on the end cars of a train and the locomotive, was done according to a predetermined schedule arranged to conform to the short time that the locomotive and train standing at the terminals, between trips. With this arrangement, the passenger service on the day of changing was maintained with its usual regularity.

The switching locomotives was provided with a special design of double-headed couplers, enabling it to handle cars equipped with either type of coupler.

TABLE.—NUMBER OF PASSENGER CARS AND LOCOMOTIVES ON WHICH THE COUPLERS WERE CHANGED.

Passenger cars changed on July 16 and 17.

Region	Both ends	One end
Tokyo	90	504
Nagoya	51	353
Kobe	70	432
Moji (Sanyo district)	25	109
Sendai	40	345

Passenger cars changed on July 19 and 20.

Region	Both ends	One end
Moji (Kyushu district)	42	315
Total passenger cars: Kyushu district ...		1,046
Total passenger cars: Main Island ...		7,498
Total locomotives		3,205

The passenger cars newly built and put into service in July, 1923, replace the cars composing the limited express trains on the Tokaido Line were equipped with automatic couplers, except those at both ends of the train as they were not to be used in other trains.

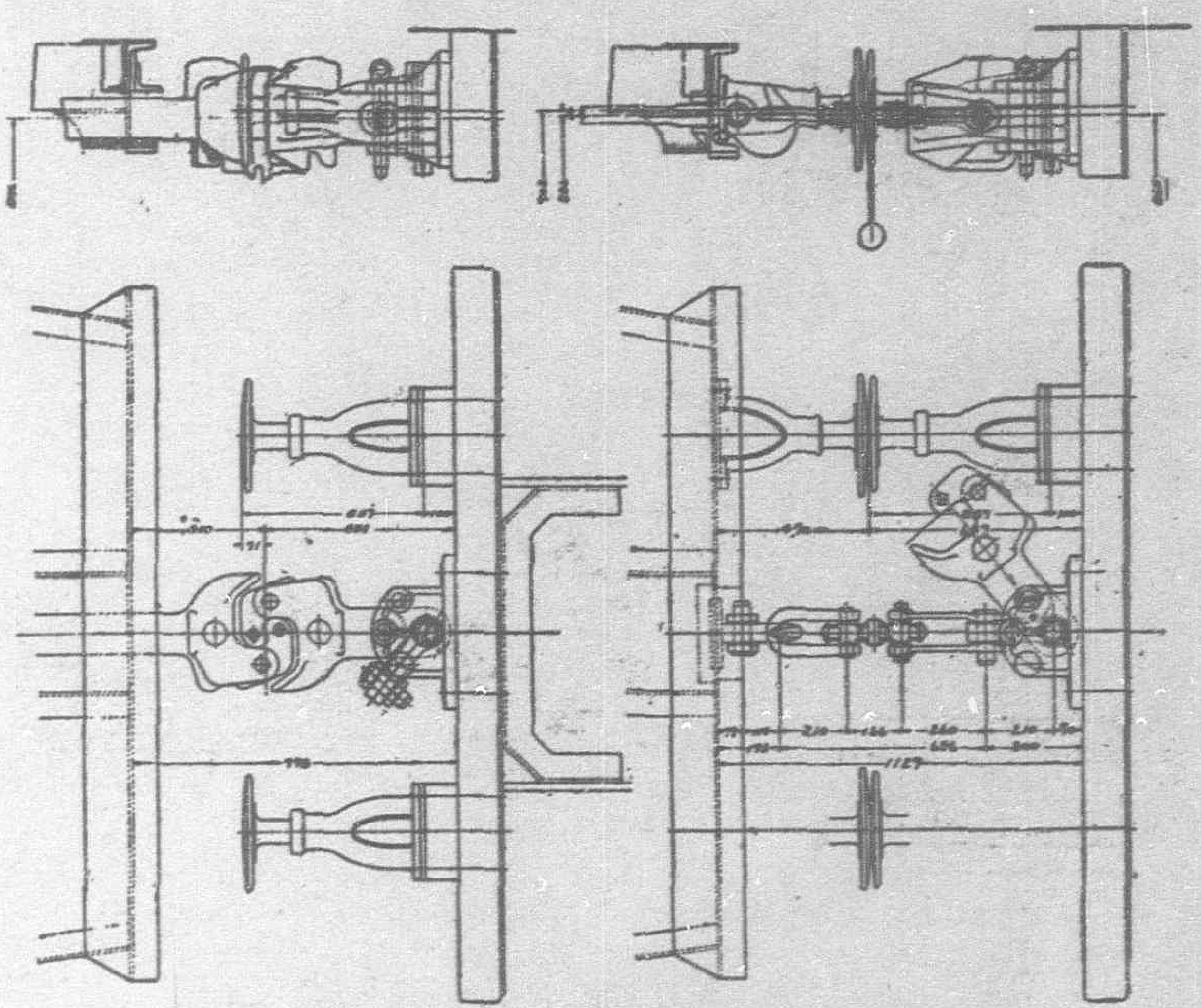


Fig. 6.—Double-headed Coupler on the Front of a Switching Engine

Multiple unit electric cars on the suburban lines of Tokyo could be converted into the new system at any time independent of the other cars, the changing of couplers on them started in March, 1920, and all the new cars built in and since 1920 were equipped with automatic couplers.

Changing the Couplers on the Freight Cars

As the conversion of couplers on the majority of the freight cars was done on July 17, freight train service was suspended for one entire day, namely, from midnight to midnight, except for special freight trains used for the transportation of fish and other perishables, etc. In some districts the number of delayed trains was comparatively great, and at points where the station yards were fairly large, it was found that the changing work could be performed by suspending only a few freight trains. It would have been poor practice to have adopted such a system on the main lines, because a delay in any station would have caused confusion on the whole system, and even the passenger service might have been seriously affected. For this reason, after the suspension of the regular freight trains, all of the freight cars were collected at the larger stations selected for changing couplers during the night.

There was a total of 223 such stations, and, as fast as the cars arrived at the changing stations, they were arranged at regular intervals of about 6 ft., buffer to buffer.

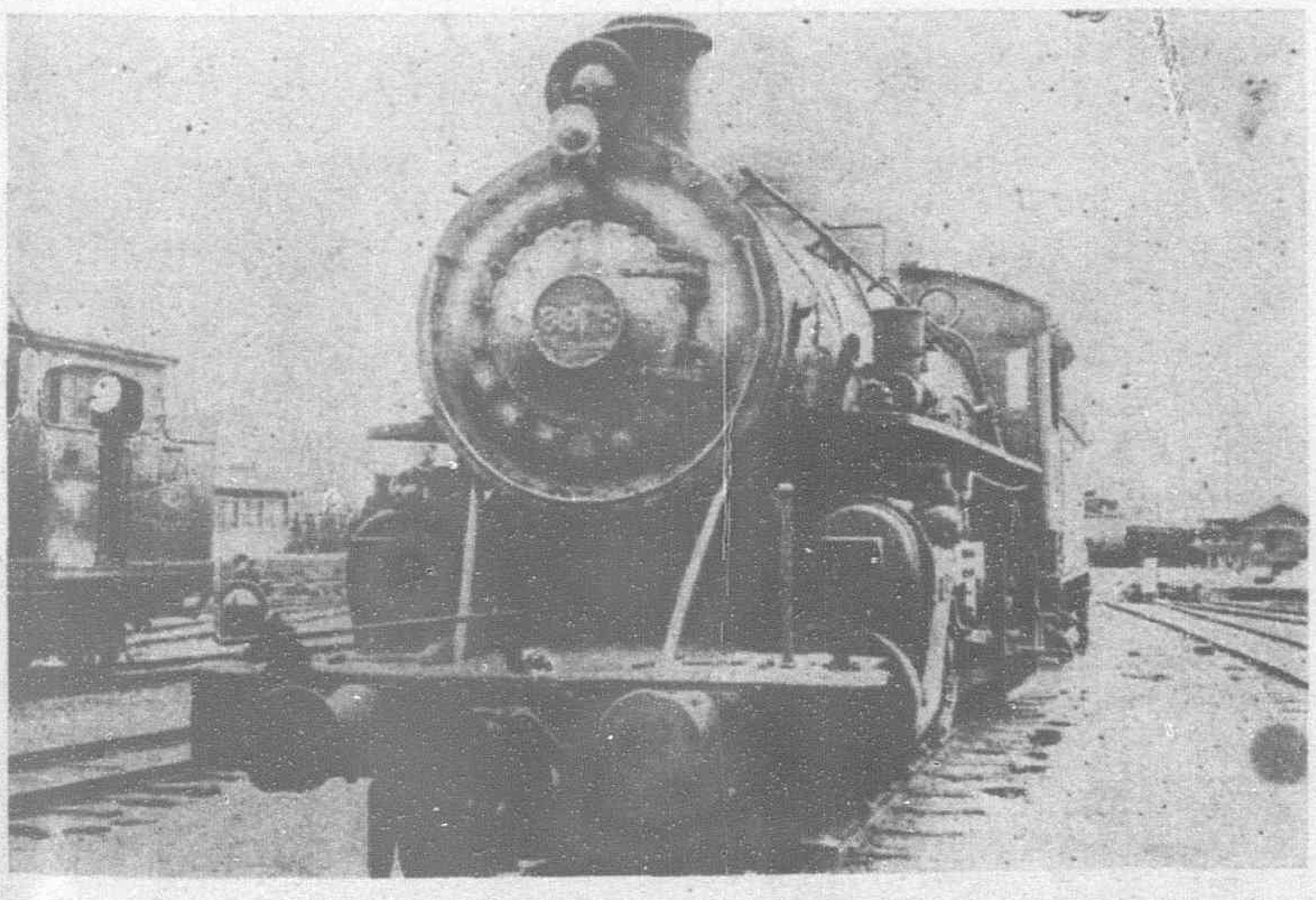


Fig. 7.—A Locomotive with the Old Type of Screw and Link Coupling and Side Buffers

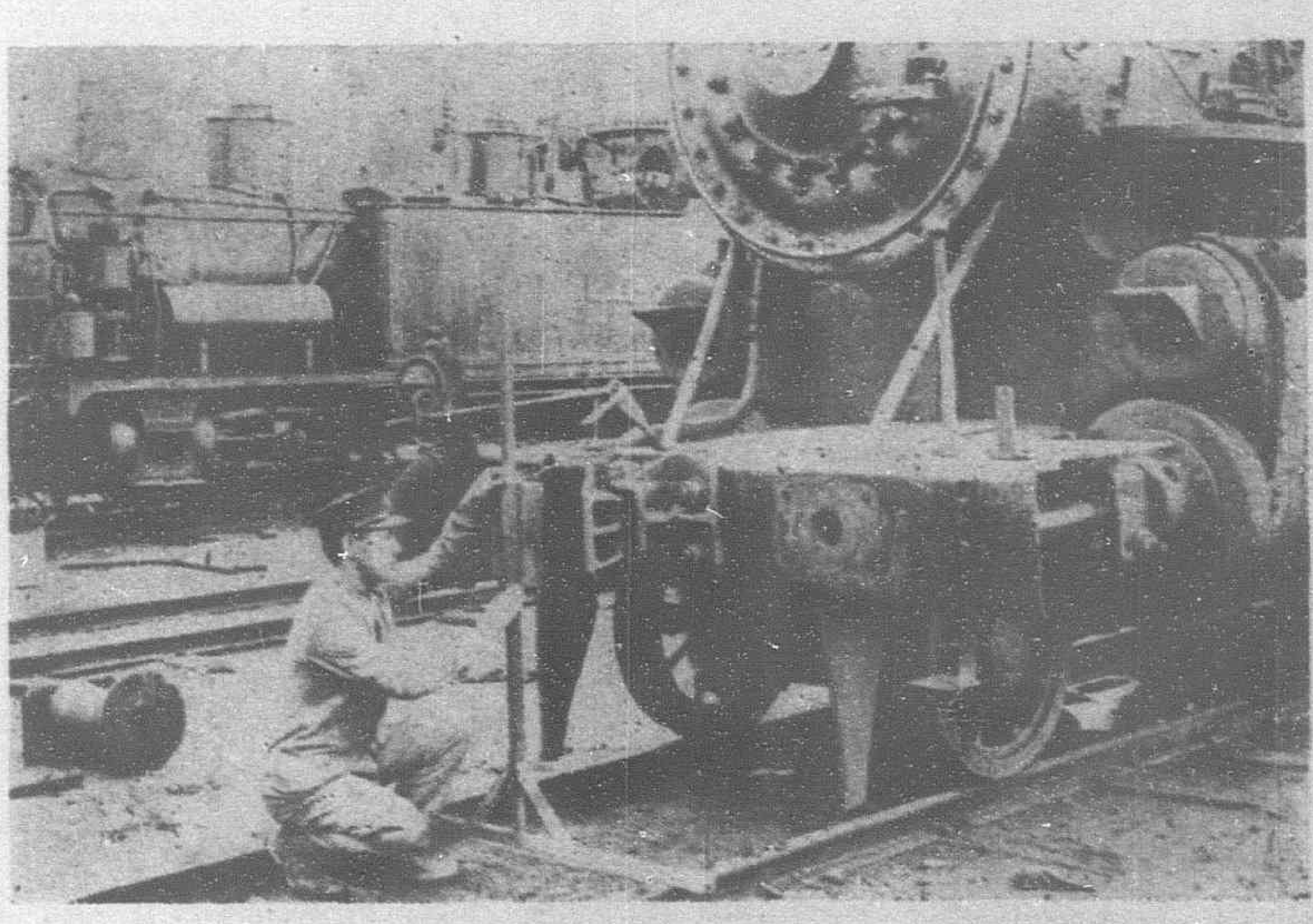


Fig. 8.—Changing of the Coupler on a Locomotive Completed. Inspection of the Work

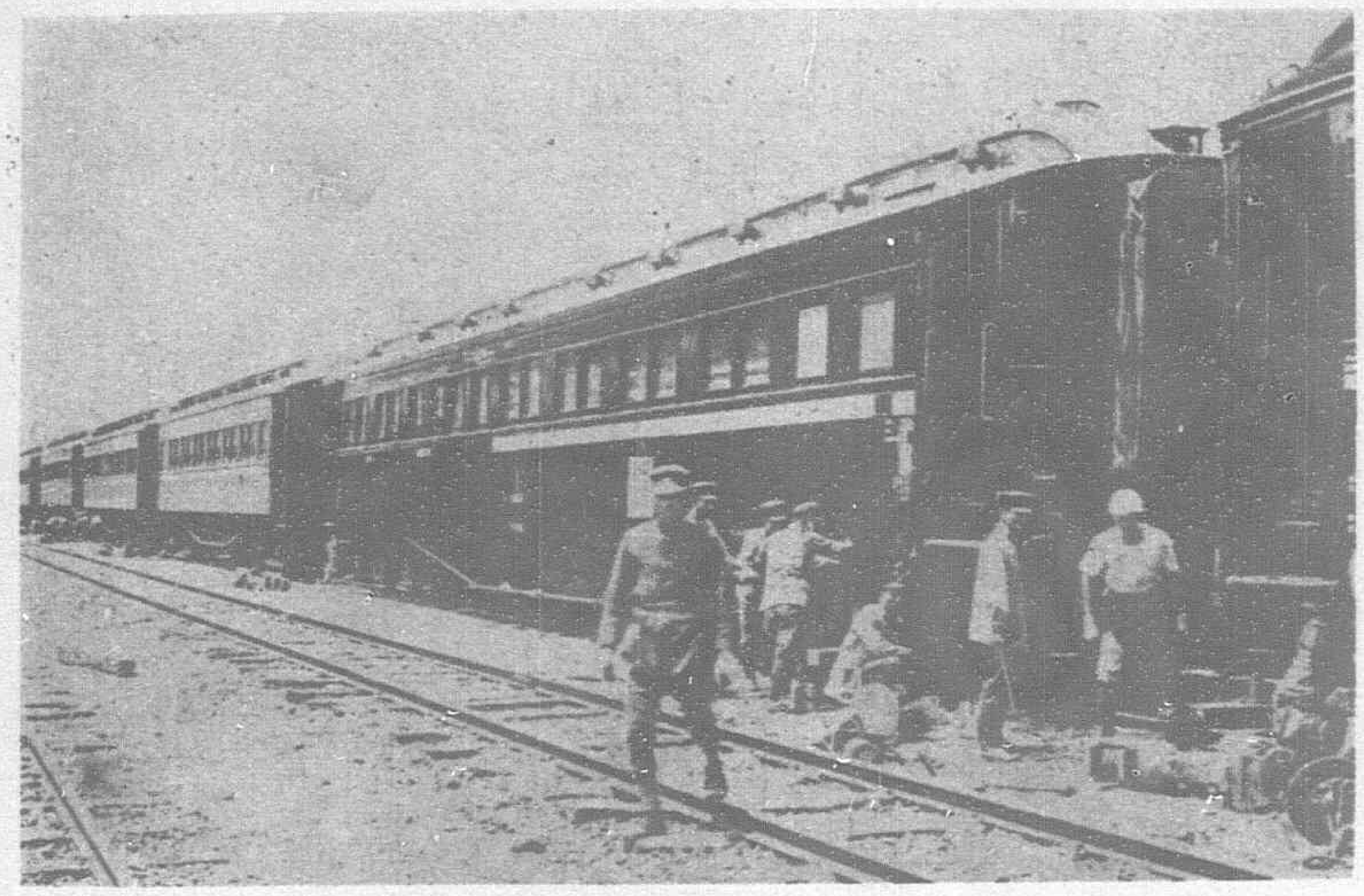


Fig. 9.—Passenger Cars Standing at a Changing Station

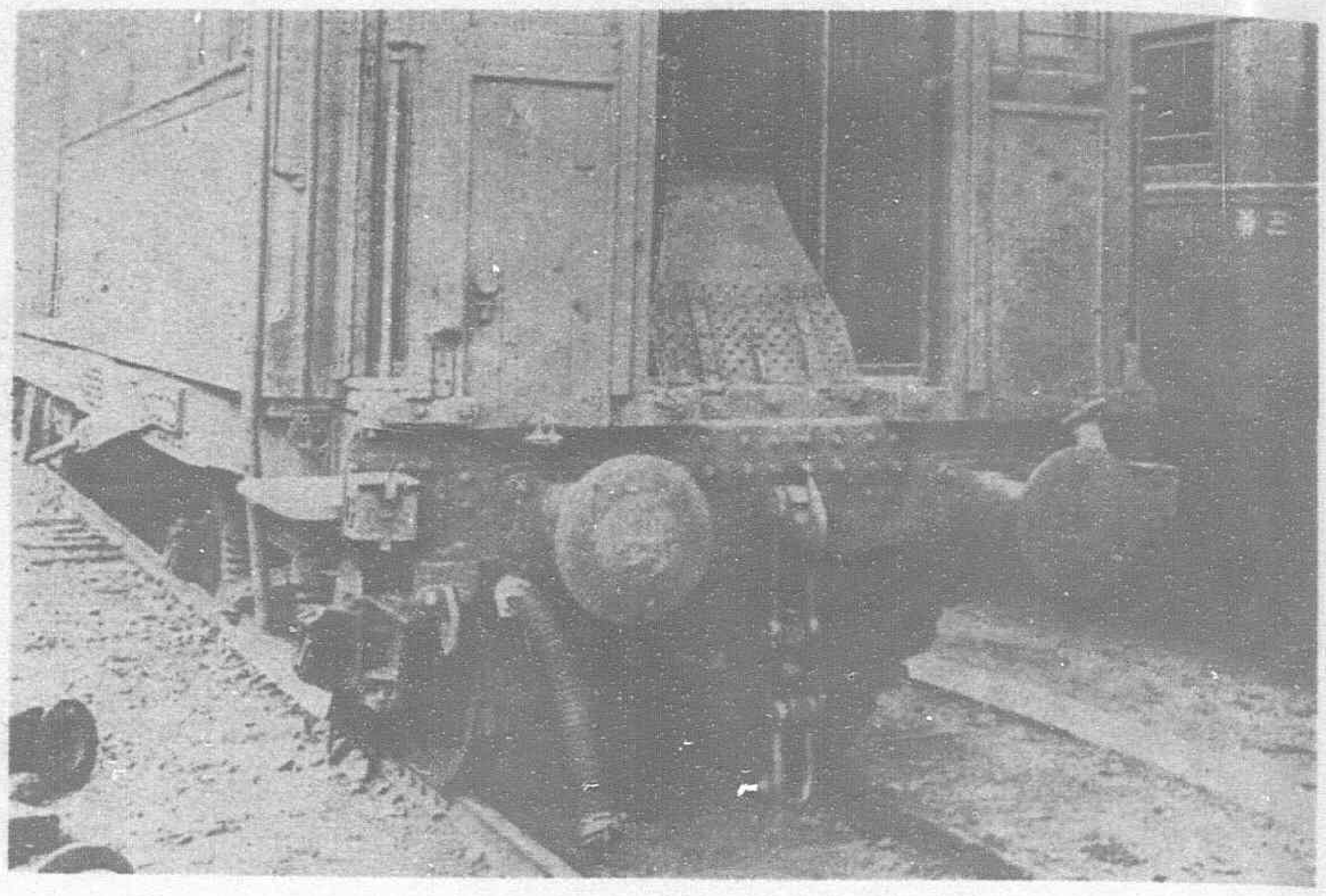


Fig. 10.—A Passenger Car with the Old Type of Coupling

The plans required that the cars be arranged by 5 a.m. and the work of changing commenced at that time. It so happened that the work was started at some stations as early as 4 a.m., part of the work being done on the previous day. All of the changing work in the Sendai Region was completed before noon. The work was finished in the Kobe Region at 4.30 p.m., in the Tokyo Region at 5.30 p.m., in the Moji Region (Sanyo district) at 6.40 p.m., and in the Nagoya at 8.00 p.m.

One of the most important factors of the change-over work was the final inspection. In order that the work of inspection might be carried on efficiently, the foremen in the repair shops were previously instructed, and these men served as inspectors as well as supervisors of the work.

The old couplers and buffers were loaded into empty cars as fast as they were removed and were not allowed to litter up the yard and so hinder the progress of the work. They were later sent to various shops to be handled as scrap.

TABLE.—NUMBER OF FREIGHT CARS AND WORKMEN ASSIGNED TO EACH COUPLER CHANGING STATION.

Region	Tokyo	Nagoya	Kobe	Moji Sanyo distr.	Moji Kyushu distr.	Sendai	Total
Number of cars per workman	3.1	3.1	3.2	3.7	3.9	2.9	3.5
Number of coupler changing stations	50	54	40	9	45	24	223
Pre-determined allotment of cars	15,000	10,000	10,000	2,500	8,650	6,500	52,650
Pre-determined allotment for July 17 and 20	12,526	8,465	7,844	1,859	7,155	4,800	42,640
Actual No. of freight cars on which the couplers were changed on July 17 or 20	12,525	8,377	7,604	1,842	7,143	4,170	41,661
Number of workmen employed on July 17 or 20 ...	4,007	2,681	2,375	503	1,207	1,378	12,151

It was feared that many of the workmen might be injured during the work of changing, because there were many who had not been accustomed to such work. The result, however, was satisfactory. There were, of course, a few men injured, but all these injuries were very slight.

The foregoing table shows that the real number of freight cars was not far short of the pre-determined allotment of cars.

Couplers

As the automatic couplers used in the Sapporo Region (Hokkaido) and on our Formosan, Korean and South Manchurian Railways were of American types, it was naturally decided to adopt the same for the others. It was deemed that " D " type was too heavy for the Japanese cars at present and the so-called " 300 pound " type was judged to be sufficient.

Couplers had been purchased, as wanted, every year since 1919. The following table shows the number of couplers up to the final changing work :

TABLE.—NUMBER OF COUPLERS PURCHASED.

Fiscal Year	Couplers Number	Couplers Cost	Accessory Cost
		Yen	*Yen*
1919...	200	14,020	89,298
1920...	300	22,470	256,500
1921...	—	—	83,485
1922...	72,914	2,931,639	344,760
1923...	10	1,060	840,808
1924...	78,580	4,502,892	2,312,737
1925...	5,020	317,314	49,915

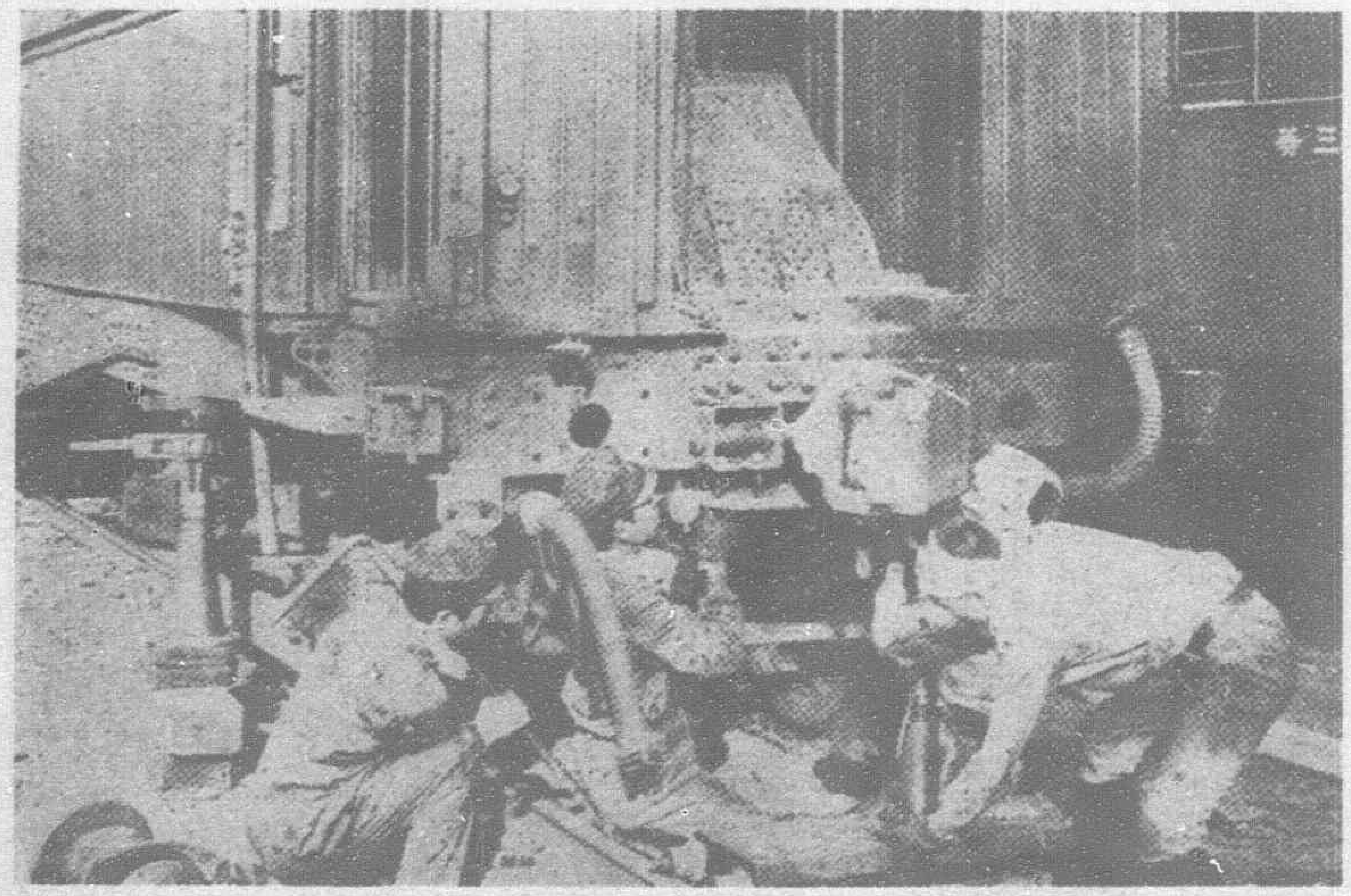


Fig. 11.—Changing Work on a Passenger Car. Setting the Shank Guides

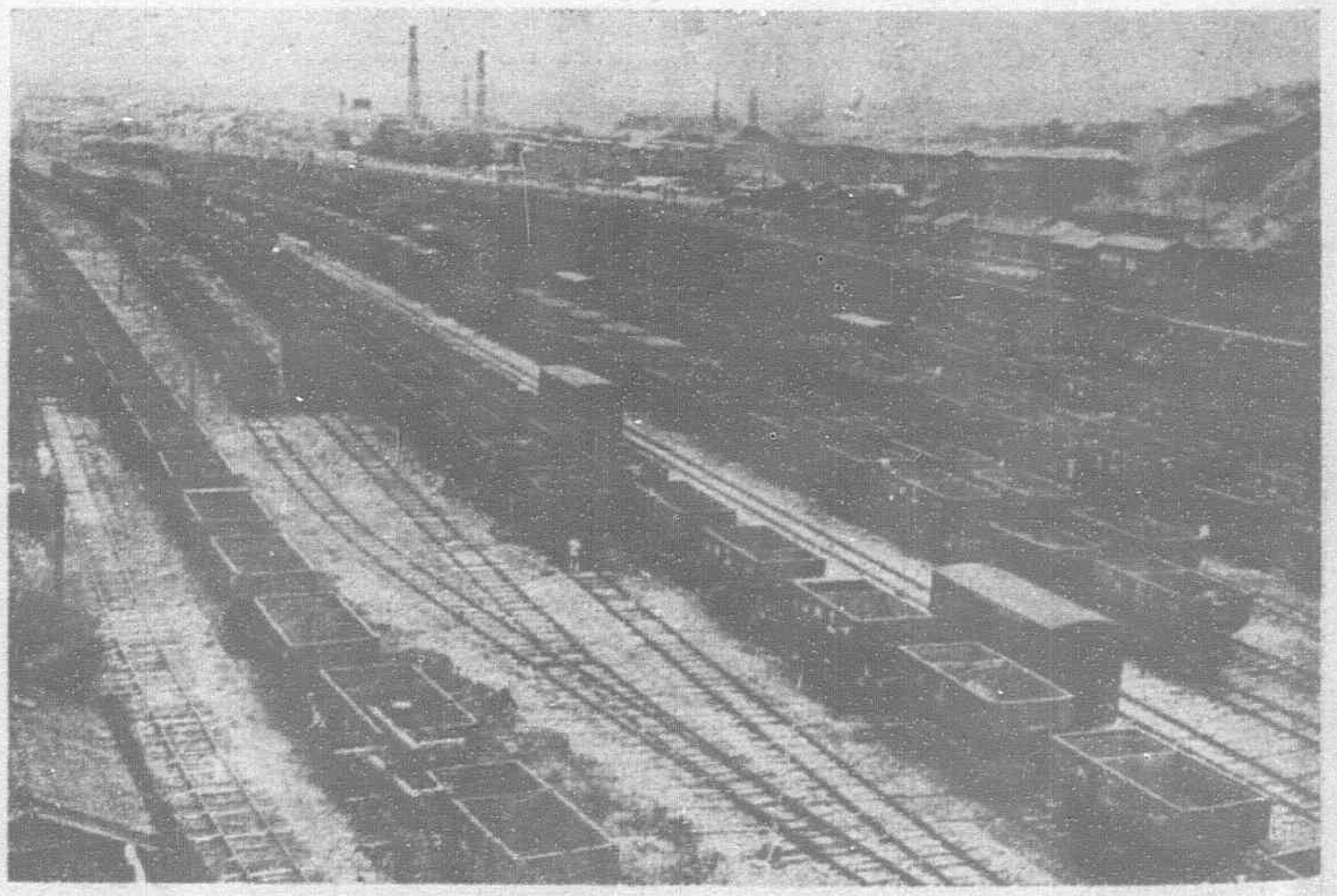


Fig. 13.—Freight Cars Standing Ready for the Changing of Couplers, Placed at an Interval of about 30-ft. (View of the Tobata Changing Station)

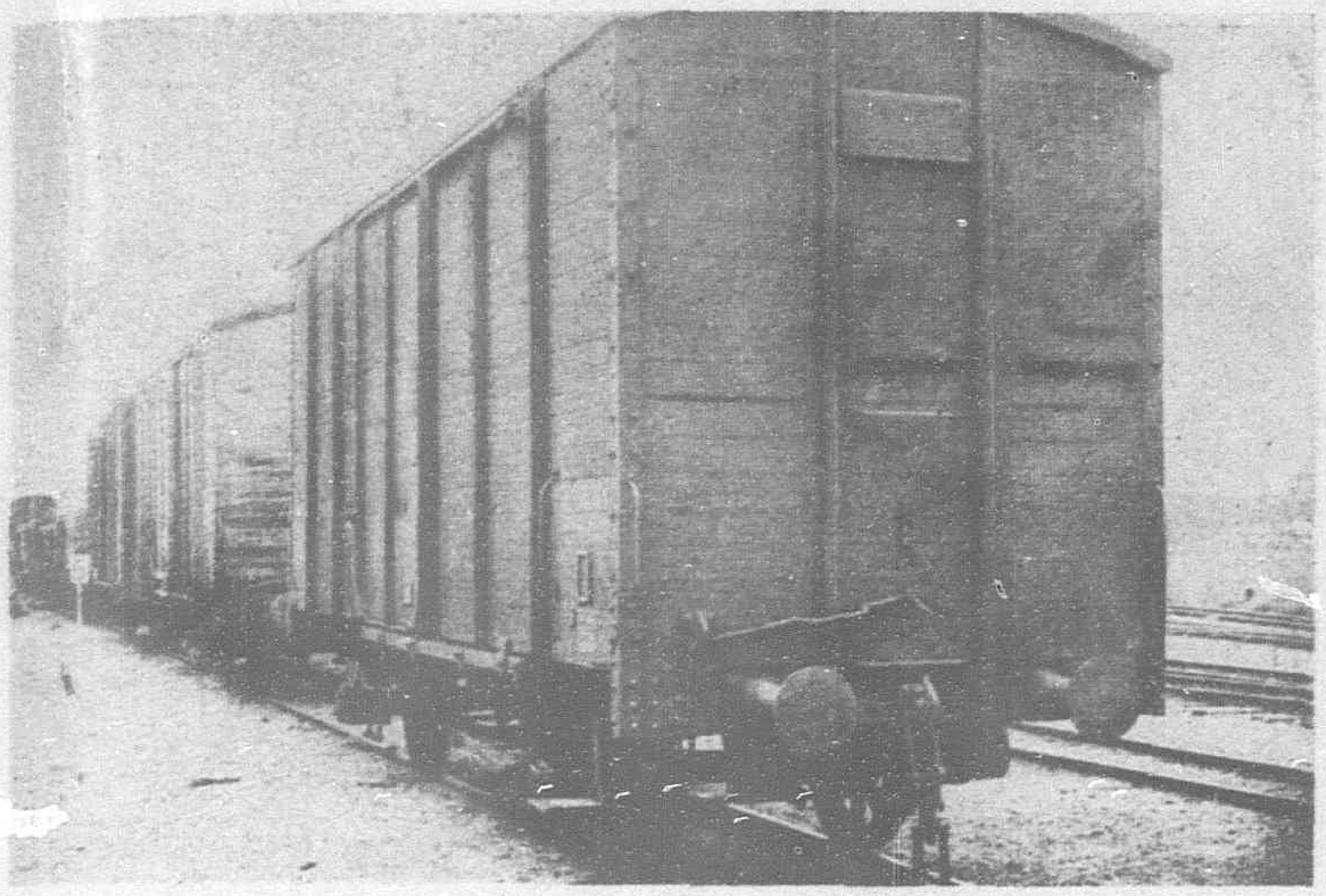


Fig. 14.—A Freight Car with the Old Type of Coupling

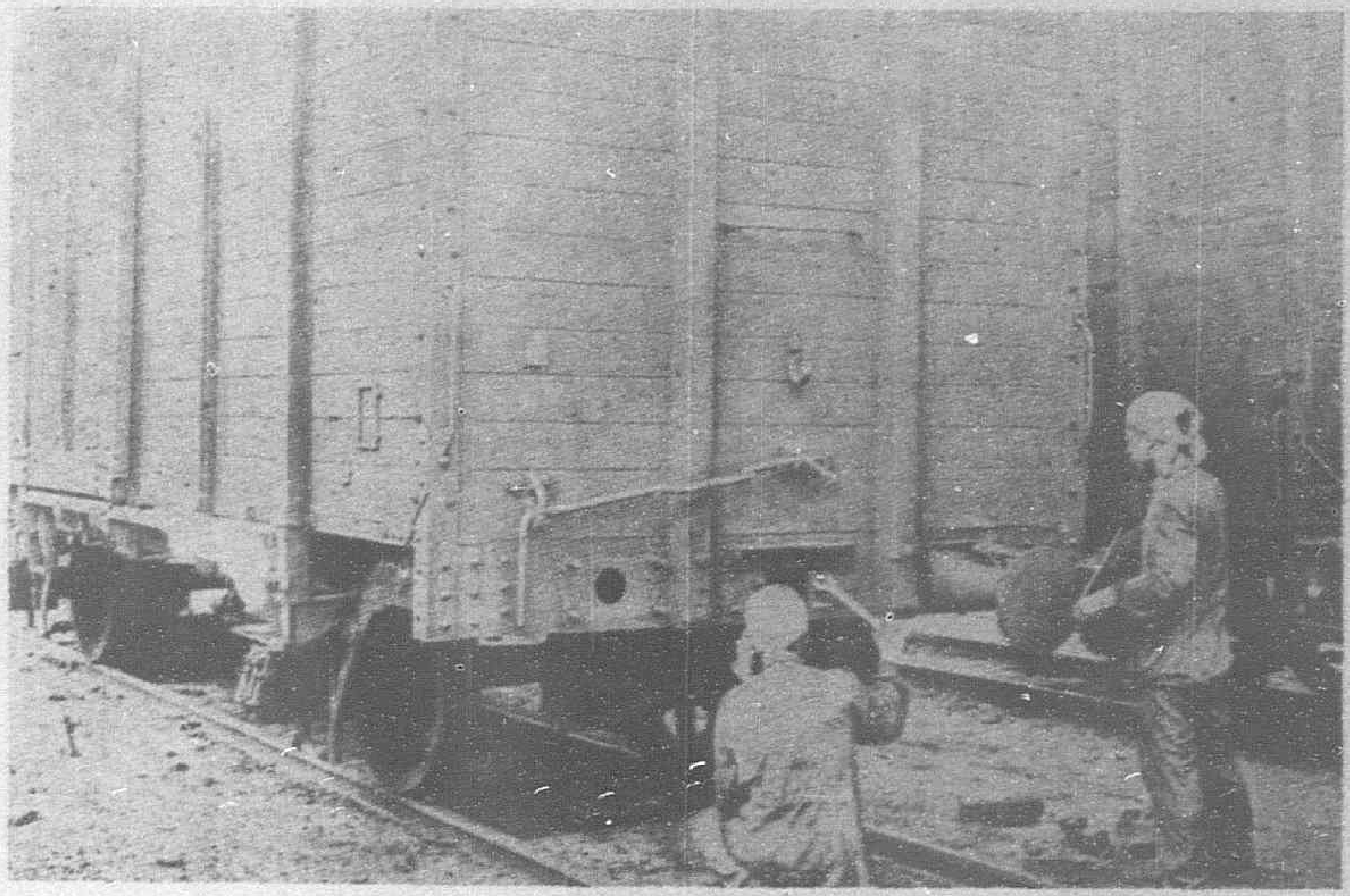


Fig. 15.—Changing Work of the Coupler on a Freight Car. (1) Taking the Old Equipment off the Car

The couplers were assembled with coupler yokes, follower plates and draft springs and put on the cars or stored for the final changing work. The following table shows the number of pairs of couplers assembled for the rolling stock:

TABLE.—NUMBER OF PAIRS OF COUPLERS ASSEMBLED COMPLETE FOR DIFFERENT TYPES OF STOCK.

		Passenger Cars		Freight Cars		
Fiscal Year	Locomotives	For old cars	For newly built cars	For old cars	For newly built cars	Total
1919		* 73				73
1920		*125		48		125
1921						
1922		1,000		20,000		21,000
1923				7,000		7,000
1924	64			20,208		20,272
1925	3,141	7,423	3,463	4,162	11,781	29,970
Total	3,205	8,621	3,463	51,418	11,781	78,488

Up to the final change of couplers, Sharon and Alliance couplers had been purchased from the United States of America as a standard type, but now the Shibata coupler, a Japanese design, which has proved to be quite satisfactory, has come into use.

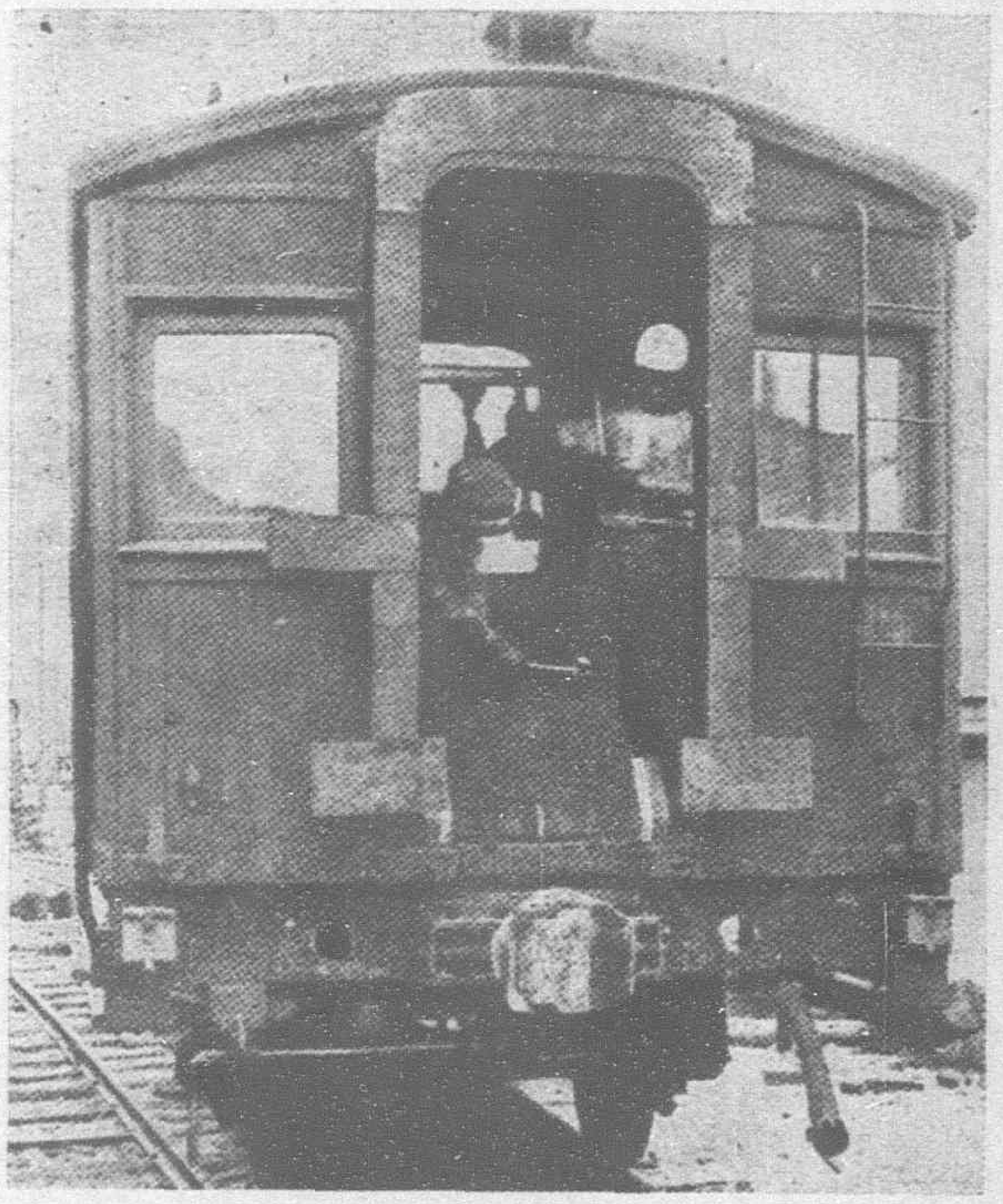


Fig. 12.—A Passenger Car After the Completion of the Changing of the Couplers. Cutting the Riveted Edge of the Gangway Apron to make up the Decreased Distance between the Cars Through the use of Automatic Coupler

Privately Owned Railways

There were many privately owned local railways, the freight cars of which were operated over the lines of the Government Railways, and they had also to change their couplers at the same time as the Government Railways, for otherwise through traffic between them would be impossible. At the very outset of the coupler conversion plan, the Railway Ministry sent a circular to the private railway companies, asking them to follow the Ministry's program. Half the expense of the reconstruction work was promised as a subsidy for those cars coming under the following category:

Freight cars coming into the Government Railways lines, having the preparatory work completed up to July, 1925.

All other cars than those mentioned above, having the preparatory work completed up to July, 1926.

A subsidy of Y. 225 per car was paid to those cars under the above-mentioned category, and one of Y. 105 per car was paid for the new cars built since April, 1921, because those cars

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*Shows the pairs of couplers used for multiple unit electric cars.

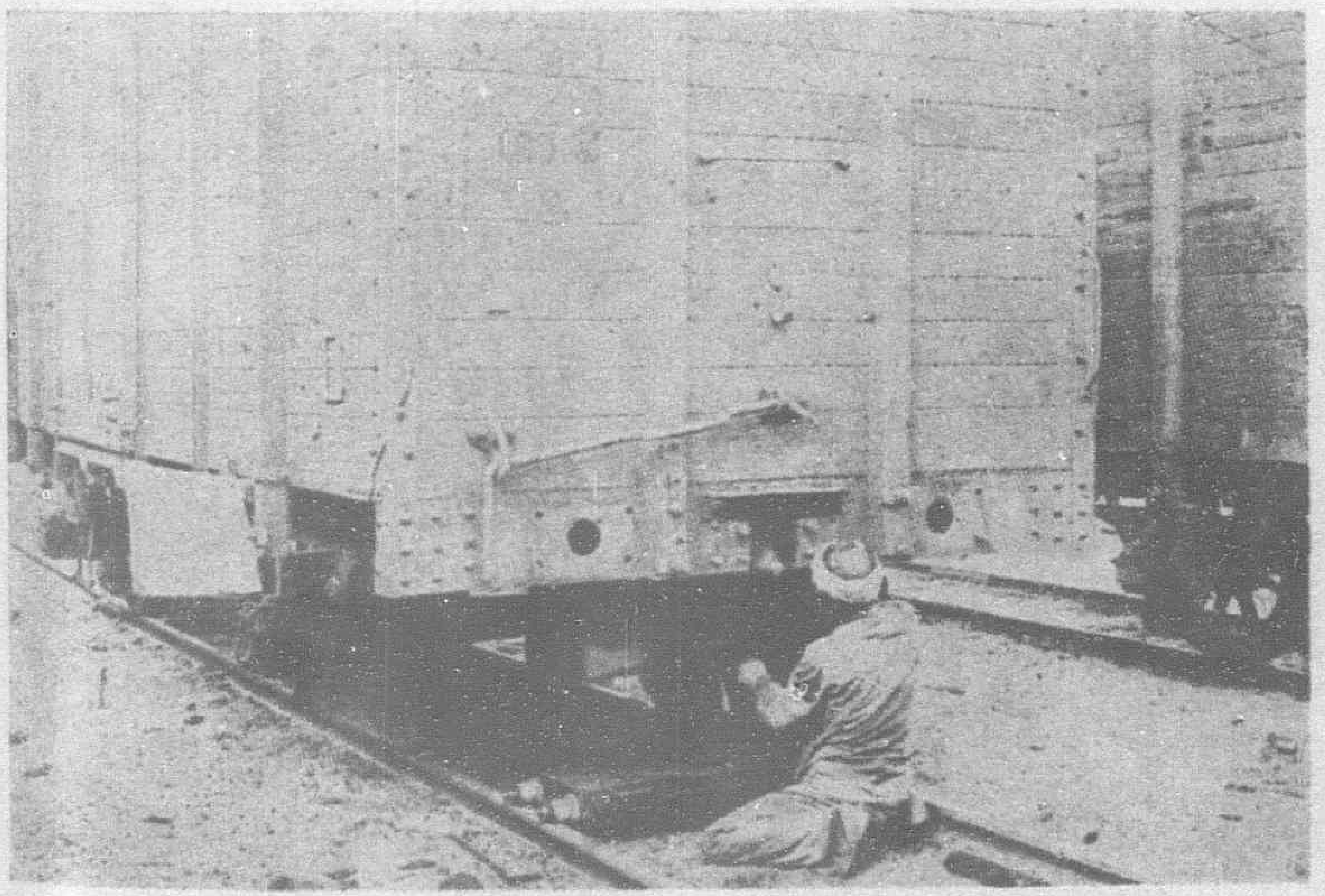


Fig. 16.—Changing Work of the Coupler on a Freight Car. (2) Taking Down the Automatic Coupler which had been Hung Under the Centre Sills

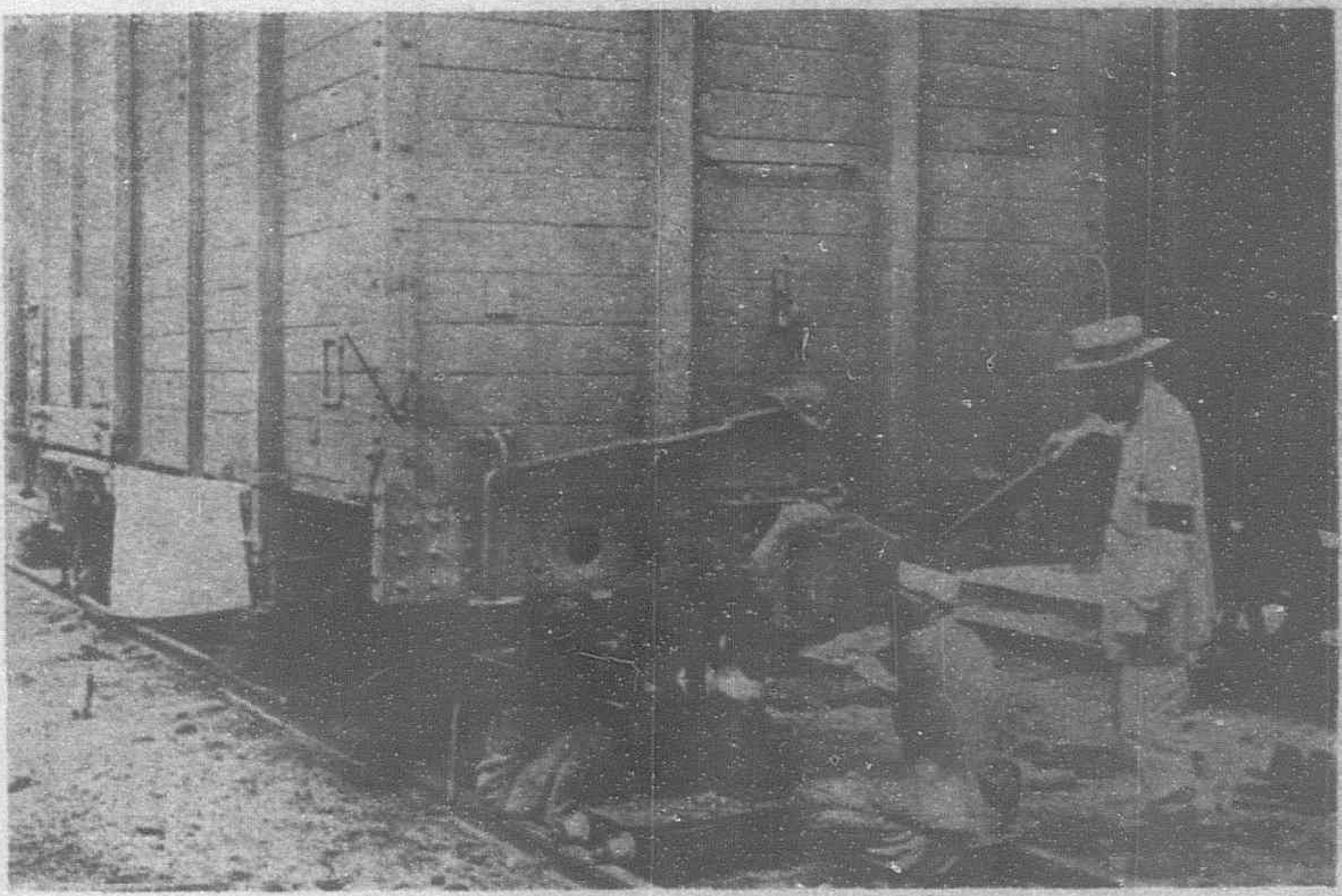


Fig. 17.—Changing Work of the Coupler on a Freight Car. (3) Jacking the Automatic Coupler into Place

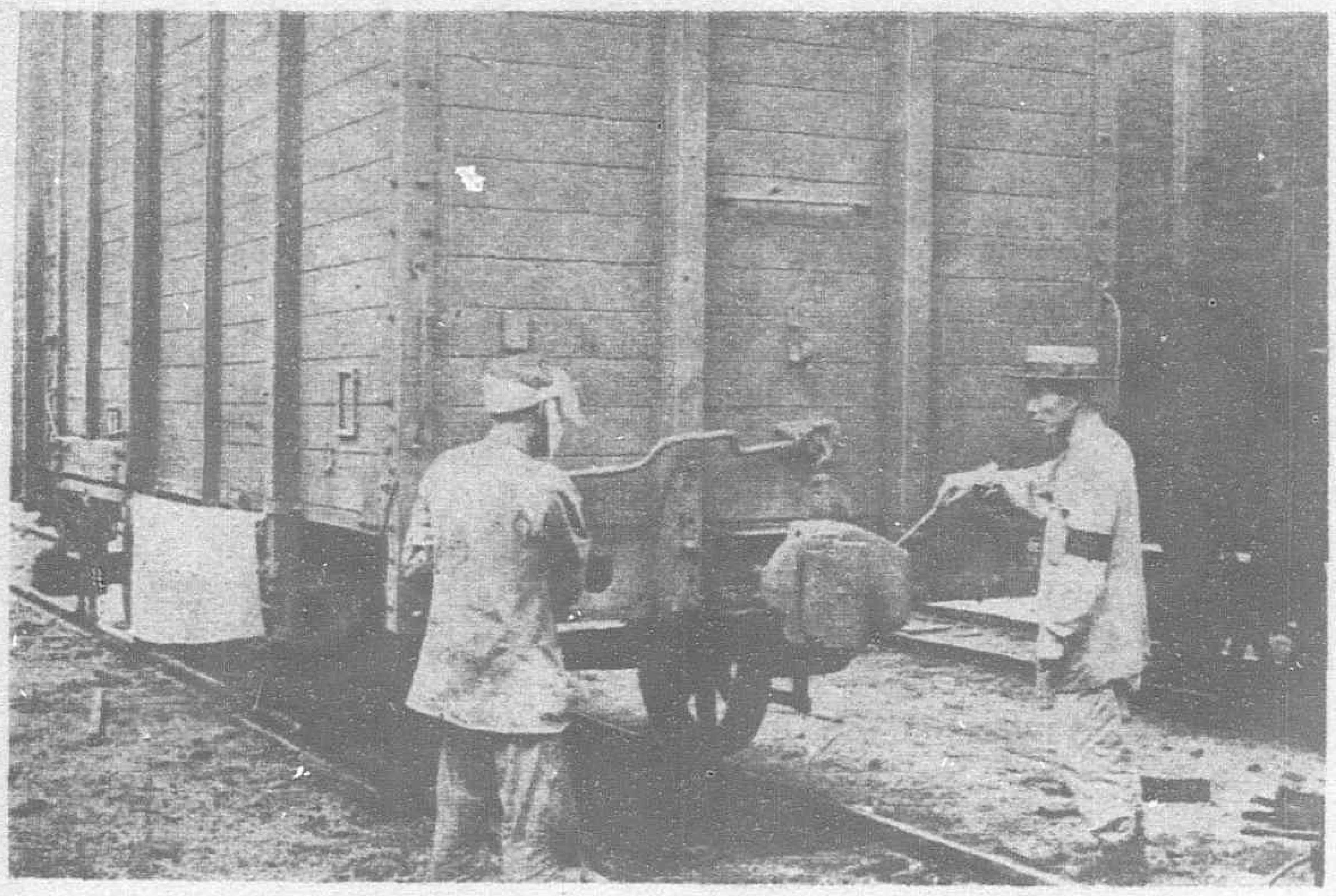


Fig. 18.—Changing Work of the Coupler on a Freight Car.
(4) Inspection after the Changing of the Couplers

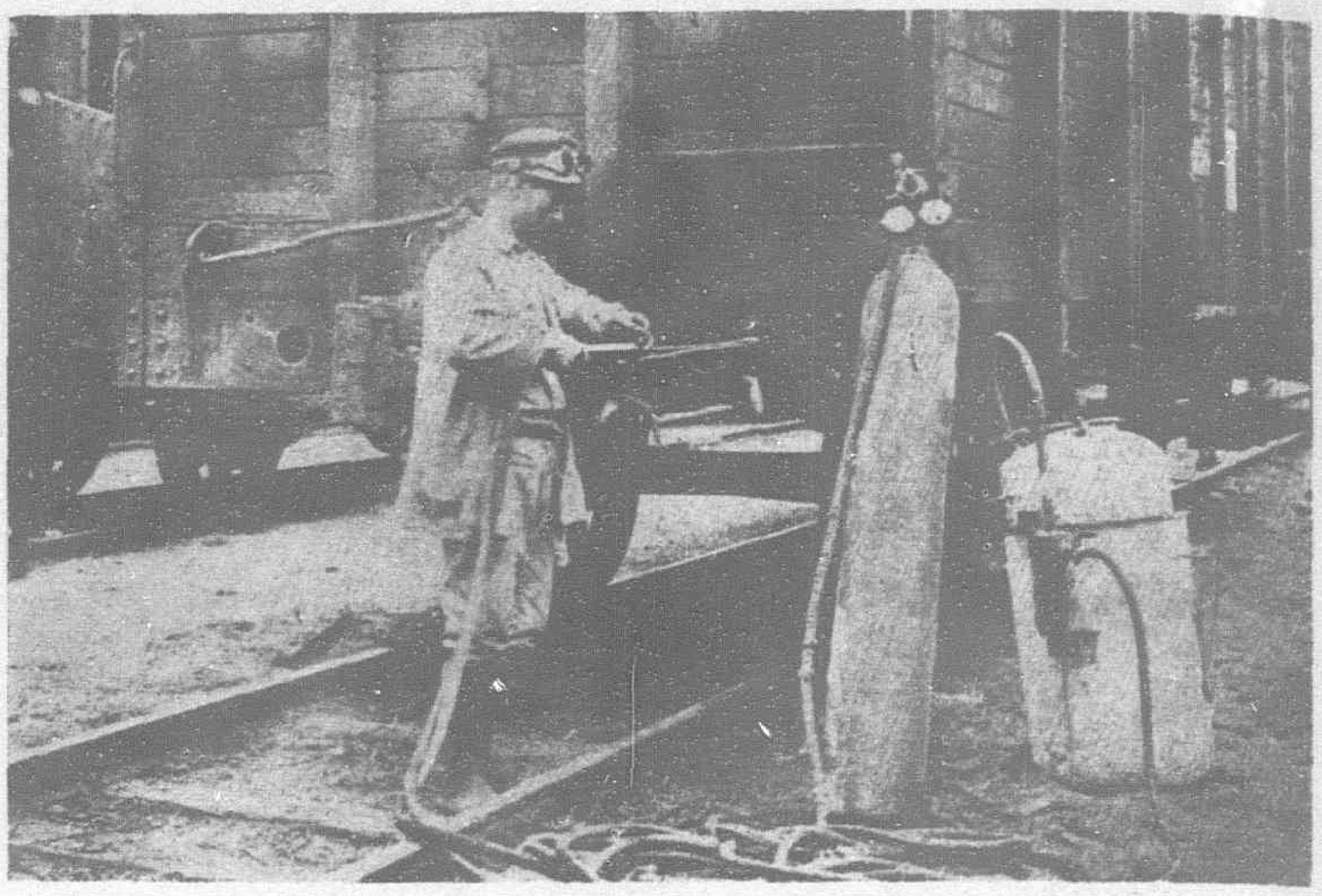


Fig. 21.—Gas Cutting in the Case of Need

should have completed the preparatory work at the time of construction.

There were 95 private railway companies which received subsidies for their rolling stock, as tabulated below:

Built before March 31, 1921

Locomotives	Passenger Cars	Freight Cars	Total	Freight Cars for Through Service
336	1130	4366	5832	3830

Built after April 1, 1921

Locomotives	Passenger Cars	Freight Cars	Total	Freight Cars for Through Service
126	352	1282	1760	1196

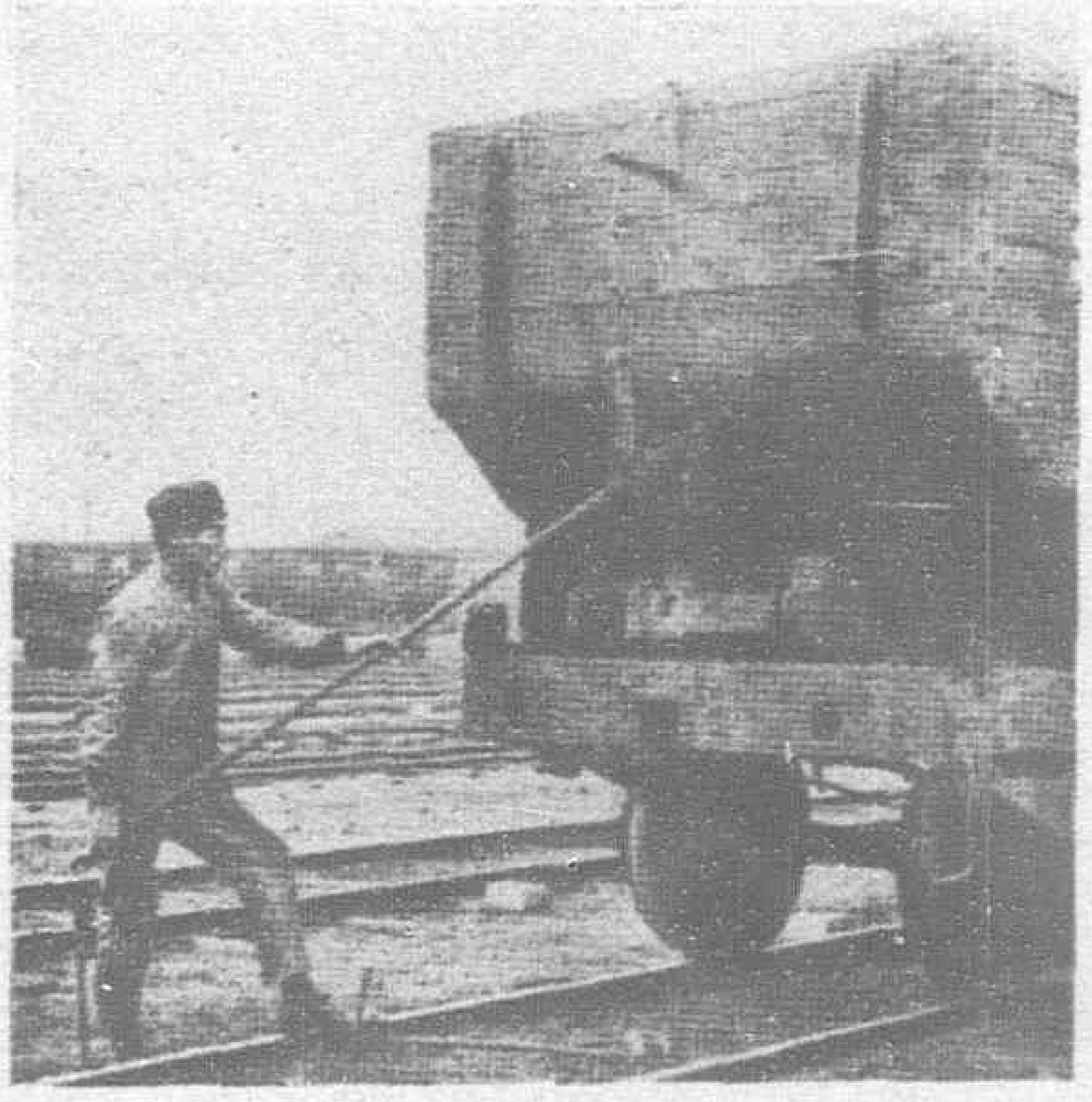


Fig. 19. Changing Work on a Hopper Coal Car.
(1) Taking down the Automatic Coupler which had been Carried on the underframe

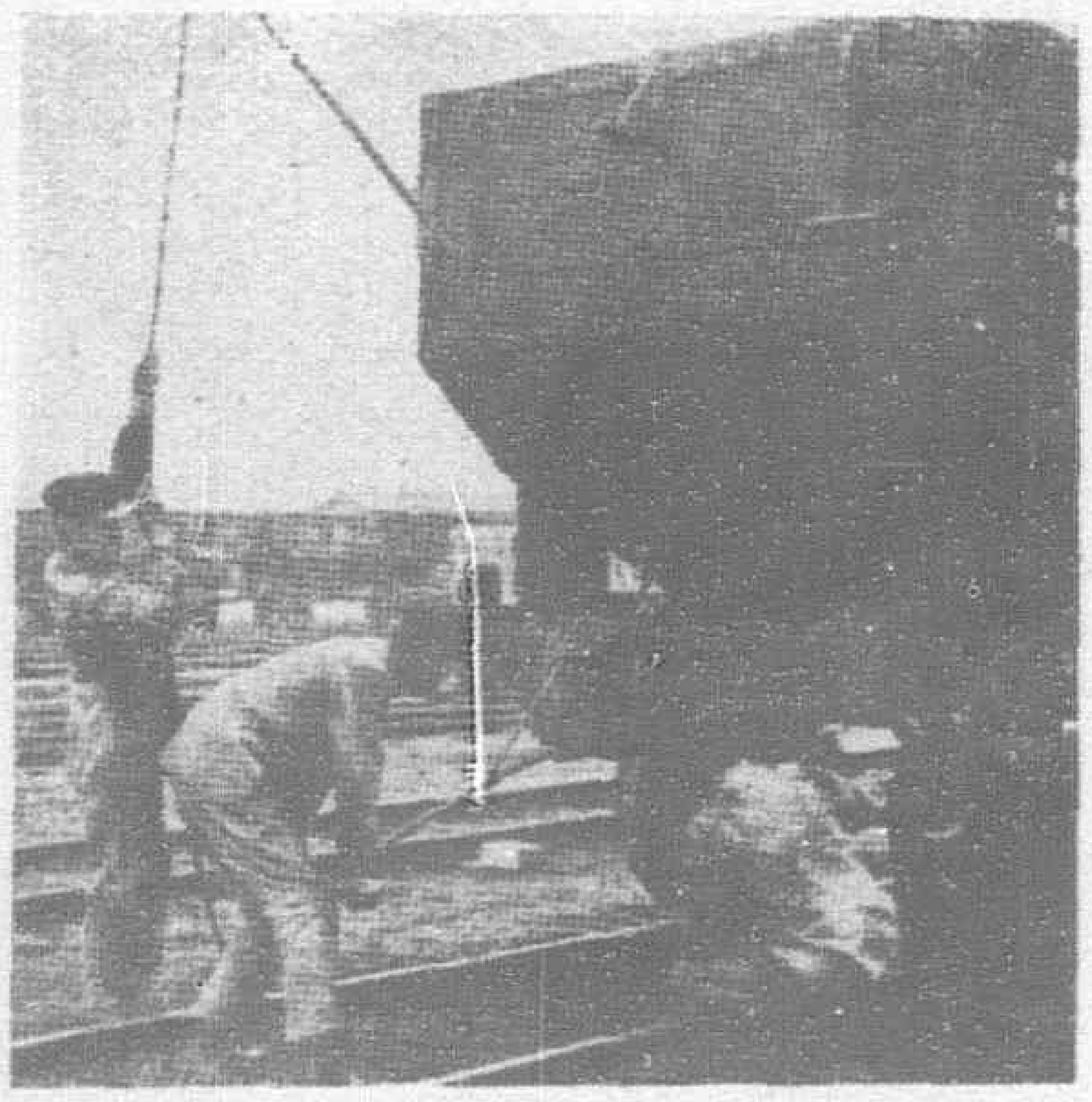


Fig. 20. Changing Work on a Hopper Coal Car.
(2) Putting the Coupler into Position

Many private railway companies asked the Railway Ministry to do the preparatory and coupler suspension work on their rolling stock for them at the Ministry's works. 154 locomotives, 340 passenger cars and 1,780 freight cars received preparatory work at the Government Railways' shops. The same work was done also on 408 privately owned freight cars, running on the Government Railway lines. For those cars no subsidy was given.

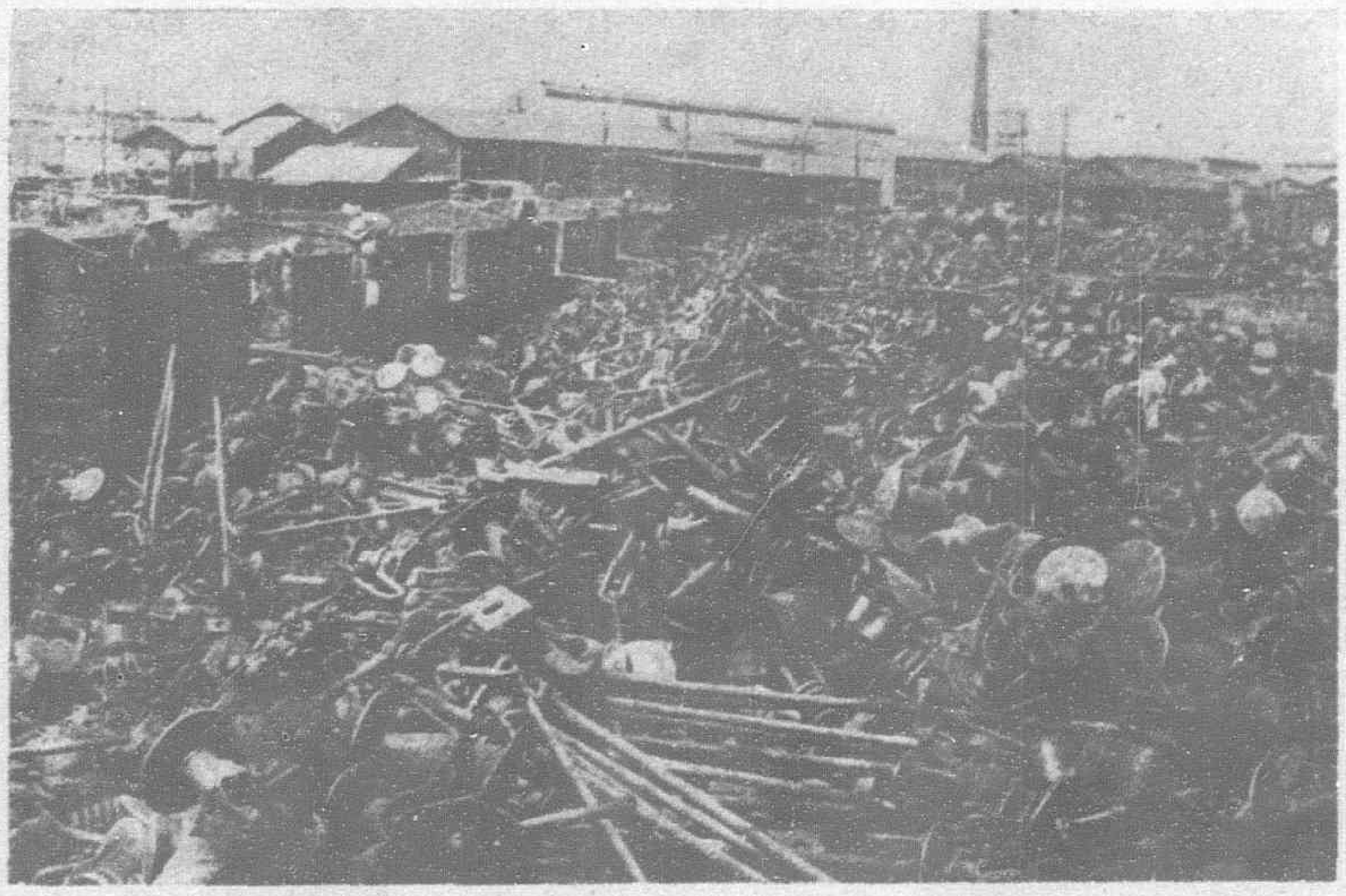


Fig. 22.—Heaps of Removed Materials

Expenses

(1) The total expenditure required for the preparatory work made on the rolling stock since 1919 amounted to:

Items	Number of vehicles	Cost
Locomotives	2,714	Y. 627,852
Passenger cars	6,118	2,493,203
Freight cars	40,514	9,501,140
Total ...	...	Y. 12,622,140

Cost per vehicle on an average:

Locomotives	...	Y.231
Passenger cars	...	407
Freight cars	...	234

Man-days, working expense and material cost required for the preparatory work on the rolling stock per vehicle on an average:

Items		Locomotives	Passenger cars	Freight cars	Mean
Man-days	...	23	36	15	18
Cost { Working,	yen	161	215	84	105
Cost { Material,	,,	70	192	150	151
Total	,,	231	407	234	256

Note :—1 man-day = 9 man-hours

(2) Automatic Couplers, Accessories and their fixing cost.

Items	Locomotives	Passenger cars
Couplers ...	Y. 527,116	865,751
Accessories	168,564	543,445
Erection ...	8,390	43,543
Total ...	704,070	1,452,739
No. of vehicles	3,205	8,544

Items	Freight cars	Total
Couplers ...	4,689,953	6,082,820
Accessories	3,357,201	4,069,210
Erection ...	123,365	175,298
Total ...	8,170,519	10,327,328
No. of vehicles	51,552	63,301

Man-days, working expense and material cost required per vehicle on an average:

Items		Locomotives	Passenger cars	Freight cars	Mean
Man-days		0.27	0.61	0.29	0.33
Cost { Working,	yen	2	5	3	3
Cost { Material,	,,	218	165	155	160
Cost { Total	,,	220	170	158	163

(3) Suspension work of Couplers under the centre sills for freight cars amounted to Y.631,177, costing on an average Y.12 per car :—

Fiscal Year		Number of cars	Cost
1923	...	19,898	165,821 yen
1924	...	21,264	309,233 ,,
1925	...	10,025	156,123 ,,
Total	...	51,187	631,177 ,,
Mean cost per car			12.23 ,,

Man-days and working expense and material cost per car on an average for the suspension work :—

Man-days ...		...	0.81
Cost	Working	...	5 yen
	Material	...	7 ,,
	Total ...	...	12 ,,

(4) Expense for the changing work.

The total for this work amounted to Y.396,782
Wages (for day-workers only) 81,743 yen
Travelling expenses 131,386 ,,

Special allowances were given to those who took part in the final changing work.

(5) Expense for the meals served on the day of the final change amounted to Y.14,172.62.

TABLE.—THE TOTAL OF EXPENSES FOR CHANGING THE COUPLERS (SUMMARIZED).

Items		Locomotives	Passenger cars	Freight cars	Total
Preparatory work		627,852	2,493,203	9,501,140	12,622,195
Couplers, accessories and their fixing		704,070	1,452,739	8,170,519	10,327,328
Suspension of couplers ...		—	—	631,177	631,177
Final Changing Work	General expenditure...	—	—	—	50,565
	At the changing stations	14,461	15,269	302,663	332,393
	At the works	244	3,293	10,287	13,824
	Total	14,705	18,562	312,950	396,782
Grand Total		1,346,627	3,964,504	18,615,786	23,977,482
Number of vehicles		3,205	8,544	51,552	63,302
Average expense per vehicle ...		420	464	361	
Subsidies to the privately owned railways					1,470,115

Conclusion

The foregoing is a brief account of the progress of the changing of couplers on the Japanese Government Railways. It seemed a very difficult matter, when first contemplated, to carry out such an important undertaking as changing the method of coupling carriages on such a large system as that of the Japanese Government Railways, having over 7,800 miles of lines open to traffic with an operating result of 11,645 million passenger-miles and 7,227 million ton-miles and a great number of carriages and employees, the latter amounting approximately to 200,000. However, this was done without any particular hitch and has brought about a lot of favorable results, which may be given as follows :—

1. The number of employees injured or killed was greatly reduced. This is above all a matter for congratulation.

2. The accidents caused by the detaching of cars were decreased, and consequently a higher standard of safety of passengers was attained.

3. In spite of the fact that locomotives in this country are required to have a large tractive power, owing to the existence of many sections with sharp gradients, it has hitherto been necessary to limit the tractive power of locomotives considerably on account of the weakness of couplers, but, on the completion of the new installation, this obstacle was eliminated, and the unit of trains was greatly increased. For instance, the weight of a freight train plying on the main lines was formerly from 600 to 700 tons, but has now been increased to from 900 to 1,000 tons.

4. The air brake on freight trains has come into use. By the perfection of the new coupling installation, the strength of the coupler was increased and rendered capable of withstanding fairly strong shocks, thus having a favorable effect on the aforesaid air brake problem on freight trains, namely it has become possible to adopt a system of fairly strong brake action.

Of course, it might be possible to increase the tractive power of locomotives to a certain extent by improving the material for couplings of the same type that has hitherto been used ; but best of all is it to obtain much better result and at the same time eliminate the danger to employees. It is a matter for great congratulation that the Japanese Government Railways have succeeded in the adoption of the automatic couplers, thereby greatly aiding the development of traffic in Japan and ensuring the safety of employees as well.

Roads in Yunnan Province, China

Vice-Consul Culver B. Chamberlain, Yunnanfu

YUNNAN Province, with an area of 146,000 square miles and a population of 10,000,000, has until recent years been utterly devoid of roads over which motor cars could be operated, and to date this condition is only slightly improved. The Province, being far from the coast, has no contact with modern influences, and the exceedingly mountainous character of the country makes the construction of highways difficult and relatively expensive. Aside from several miles of paved streets in Yunnanfu, not sufficiently wide to accommodate motor traffic easily, there are believed to be no cities in the Province with streets that could be used by automobiles.

There being less than 400 miles of railway and no navigable waterways of major commercial importance, traffic is obliged to make use of riding and pack animals, as well as coolie carriers, over the primitive trails that constitute the only trade arteries throughout the greater part of the Province. As railway construction is in most instances prohibitively expensive, the urgent need for better communications must be met by the extensive construction of motor roads.

There are now less than 50 miles of roadways suitable for the use of the motor cars in Yunnan. All are in the immediate vicinity of Yunnanfu, the capital and commercial center of the Province. These roads, leading to the east, north, and west of the city, are being gradually extended, but progress is impeded by the inability of the local government to finance the several projects adequately.

Approximately 30 per cent. of the motor roads now completed have been built by the Yunnan Committee of the International Famine Relief Commission, with funds donated principally from abroad and with revenue derived from customs famine-relief surtaxes. The operations of the committee are proceeding. All other roads have been built at the instance and expense of the provincial government.

An official scheme for highway construction calls for tens of thousands of miles of various types of road to be built in every part of the Province ; but lack of funds will permit only a small part of this program to be realized in the next few years. Three major trunk routes now under construction, with a total length of 500 miles radiating from Yunnan as a center, may be completed in the near future : (1) To Talifu in the west ; (2) to Kwengsi frontier in the east, with a branch to the Kweichow border on the northeast (supposed to connect with roads from the adjoining provinces) ; (3) the Linan-Kotchiu-Mongtze section in the southeast. Their completion during 1929 is scheduled but unlikely. When finished, these essential roads will form a basic skeleton on which a comprehensive network of less important highways may be built, will greatly facilitate communications, and undoubtedly will create a substantial demand for motor vehicles.

Roads now completed and those under construction are merely graded, with rolled-earth surfacing. This suffices for the present exceedingly small amount of traffic, except during the summer rainy season. The use of stone, gravel, or other hard surfacing has been discussed, but time of adoption is uncertain. The work of building roads has thus far been undertaken solely with cheap coolie labor ; purchase of road-making machinery has been held up by lack of funds. However, the provincial bureau of reconstruction contemplates the purchase of tractors and other equipment for road grading as soon as either the proposed universal poll tax or a system of labor conscription can be made effective.

Hanshin Files Plan for Osaka Subway

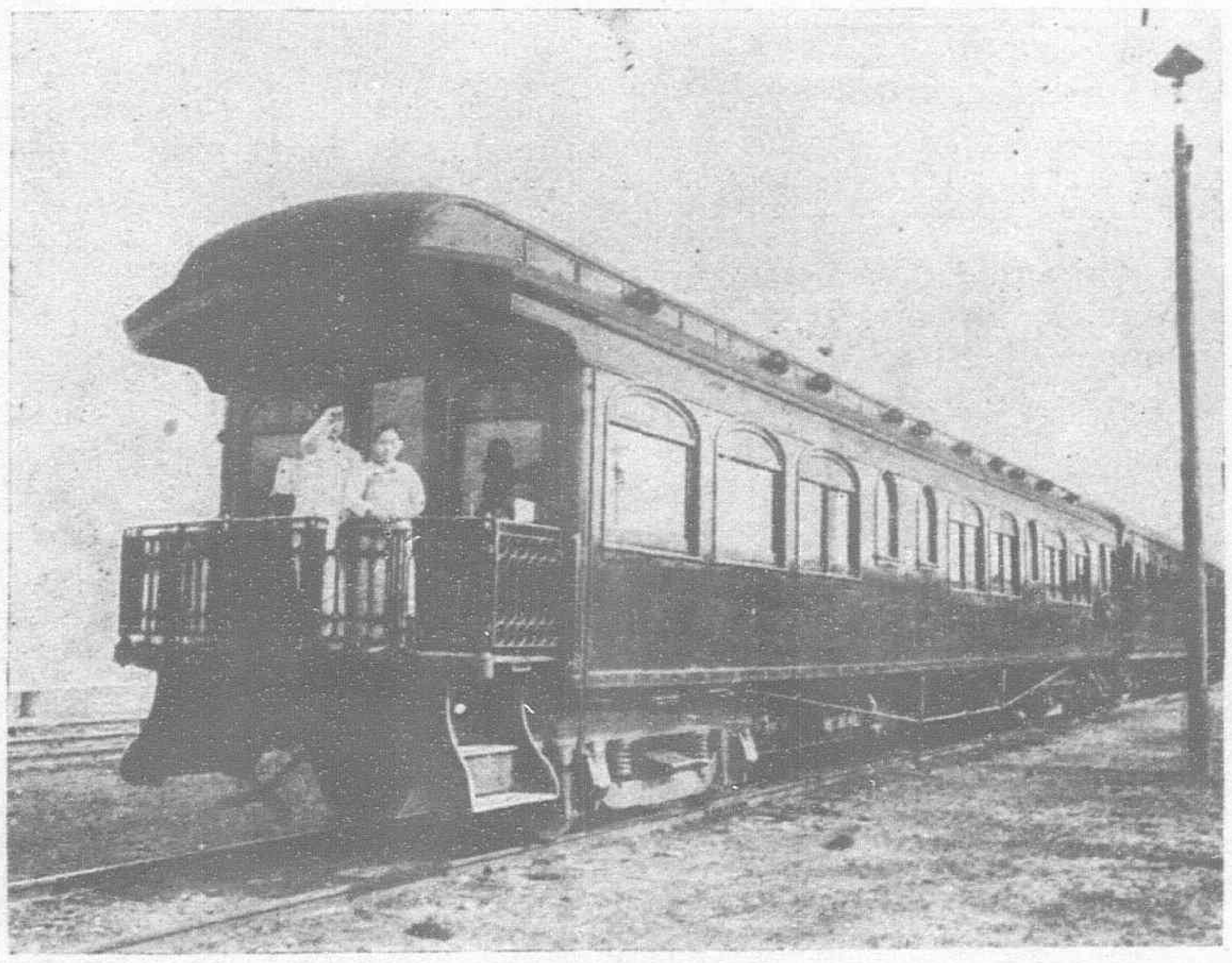
Close upon the heels of the applications for permits filed with the Osaka Prefectural Government by the Daiki, Nankai and Keihan interurbans, to build subway extensions, for facilitating better connections with one another, as well as with the City's proposed Rapid Transit system, the Hanshin tramway on June 18 filed an application for building a 16-chain quadruple-tracked subway, linking its Umeda terminus with the proposed Rapid Transit's No. 1 route, that will pass west of the Hankyu terminus.

The plan represents an outlay of Y.3,700,000. The starting-point of the proposed subway, if it materializes, will be established midway between Umeda terminus and Deiribashi car-stop, and the route, after passing under the plaza in front of Osaka Station, will meet the Rapid Transit's No. 1 route at 57 Sonesaki Naka-Nichome.

In addition to the quadruple tracked subway, the Hanshin management intends to build an underground passage, 27 feet wide, leading to the Osaka Station of the Government Railway and to the Hankyu terminus. The Prefectural Government will shortly refer the matter to the attention of the City Assembly.

The State Railways of Korea

THE first instance of a railway in Chosen was the Keijo-Jinsen line opened in 1900, and this was followed in 1904 by the opening of the main line between Keijo and Fusan. These were undertakings by private companies. In 1905 the Keijo-Shingishu main line and the Masan branch line, both built for army use during the Russo-Japanese War, were opened to the public, and with the former the trunk line traversing the country from north to south was made complete. In 1906 the Japanese Government took over all existing lines and placed them under the Railway Bureau of the protectorate, but on the Government-General being established in 1910 control of them once more changed hands. During all this time improvement and construction work was steadily carried on, and the year 1910 saw the completion of the Heijo-Chinnampo line; in 1911 the Yalu was spanned by an iron bridge to connect the Korean and Manchurian railways; 1914 the Taiden-Mokpo line in the south and the Keijo-Gensan in the centre were completed; in 1914 the Gensan-Kainei line in the north was started and by the end of 1925 three-fourths of it, measuring some 300 miles, had been completed and opened to traffic.



Observation Car

In the meantime, single control of the railways in Chosen and Manchuria being considered advisable from the commercial point of view, the Government-General in 1917 concluded a contract with the South Manchuria Railway Company and entrusted to it the entire management of the Korean State railways. This continued down to March, 1924, when the Government-General again took into its own hands the operation of the State lines in this country. At the end of 1925 the total investment in government railways reached Y.276,000,000 covering a length of 1,300 miles, or more than a two-fold extension as compared with the year of annexation when there were 640 miles in operation.

The railways in Chosen, by bridging the Yalu which forms part of the northern boundary, and making connection thereby with the continental railways, became at once part of the international railway system, and this resulted in through traffic being established between Fusan and Mukden. Though the railway business suffered for a time through the influence of the World War, it was not long before it regained and even surpassed its former activity. The following table gives some idea of railway development in this land.

Fiscal Year	Length *Miles*	Passengers	Freight *Tons*	Receipts *Yen*
1925	1,309	18,241,000	4,297,000	30,708,000
1924	1,309	17,487,000	3,794,000	29,027,000
1923	1,189	16,760,000	4,237,000	30,371,000
1922	1,777	15,252,000	3,791,000	26,952,000
1921	1,165	13,821,000	3,331,000	24,815,000
1920	1,157	12,421,000	3,186,000	23,816,000
1910	674	2,024,000	888,000	4,095,000

The hotel business as an adjunct to the railway business is run chiefly for the accommodation of foreign tourists. It was first started in 1912 at Fusan and Shin-gishu, the two principal terminals, by making use of the upper storeys of each station. In 1914 the Chosen Hotel was built on a grand scale in Keijo with two branches at Kongo-san for the convenience of mountain sightseers, and in 1922 a similar hotel was opened in Hejio.

Of the lines now under construction the remaining section of the Gensan-Kainei line will be completed in 1928, and of the Chinkai line in 1926. It is now planned to construct a line between Heijo and Gensan across the middle of the country, 133 miles in length, and this, it is hoped, will prove an important link in the chain of traffic between North China and West Japan.

Private Railways

For the encouragement of private railway enterprises in Chosen, regulations were enacted in 1912 making provision for their proper supervision and protection, and in 1914 further provision was made for granting special subsidies to important lines to meet any deficiency in profit below a certain percentage on the paid-up capital of the companies to be so favoured. In 1921 new regulations providing State aid for private undertakings were approved by the Diet and put into force for the furtherance of their development. Thus private railways in Chosen have made considerable progress, though their business condition is not yet prosperous enough to permit of them paying dividends from their earnings without drawing on the Government, and the total length open to business in 1925 reached 464 miles operated by seven companies, while new lines under construction, actual or projected, embraced some 1,300 miles by nine companies.

Goodell-Pratt Company

Mr. William M. Pratt, President of the Goodell-Pratt Company of Greenfield, Mass., known as the Toolsmiths, manufacturers of the well-known line of "1500 Good Tools," is sailing July 10 on an extended trip in Central Europe. He will visit the Company's branch in London and will visit their many representatives on the Continent.

Mr. Pratt has always been a keen observer of market trends and enthusiastically forecasts the ever-increasing opportunity for quality American-made tools. He feels that the acceptance of the Young Reparations Plan and the settled political situation in Great Britain will materially help bring about a great improvement in the relations between the European countries and will further aid them to stimulate not only their own trade, but their trade with the United States as well. Mr. Pratt, as always, lays particular stress on the manufacture of quality products and emphatically expresses the opinion that there will be at all times an increasing demand for high-grade merchandise both in the domestic market and in the export market.

It is Mr. Pratt's hope that a visit with their representatives in the Far East and in South America can shortly be accomplished. The Goodell-Pratt Company has enjoyed a phenomenal growth, which may be attributed largely to the high quality of their product which has established them in practically every market in the world.

Engineering Notes

ELECTRIC LIGHT, POWER AND TRACTION

NOSEI DENRYOKU K.K.—(Nosei Electric Power Co., Ltd.) The Kimbara Power plant of this company has just been completed. Operation is not yet started, as the power contract with Miye Godo Denki K.K. (Miye Consolidated Electric Co., Ltd.) is still pending. The capacity of this station is rated at 4,400 k.w.

CHOSEN DENKI KOGYO K.K.—(Korea Electric Industrial Co., Ltd.) This company has recently decided to extend the equipment of the Senkyori Steam Power Station. The present capacity of 6,500 k.w. is to be increased by installing two units of 5,000 k.w. generators. The plan is to provide for shortage of water during the dry season.

This move on the part of this company is looked upon with great interest. Experts anticipate that many steam power plants will be established in Korea in future.

RAILWAYS

MORE LOCOMOTIVES FOR INDIA.—Sir W. G. Armstrong, Whitworth and Co., Ltd. announce that they have secured a further order from the High Commissioner for India for the construction of twelve 4-6-2 Locomotives and Tenders of the new standard X. B. type for the 5-ft. 6-in. broad gauge lines of the Madras and Southern Mahratta Railway.

These locomotives which will be built at the firm's Scotswood Works, Newcastle-upon-Tyne will be shipped in fully erected condition on one of the motor vessels specially designed and constructed by Armstrong, Whitworth for this service.

CHINESE RAILWAY EXPENDITURES.—It is officially announced at the Ministry of Railways to-day that an amount totalling £349,625, from the Belgian Boxer Indemnity Fund, has been spent by the Lunghai Railway for the purchase of cars, locomotives and other railway materials. The amount which had been allotted to the railway from the Belgian Boxer Indemnity Fund was £370,487, thus leaving a balance of approximately £20,862 which amount will probably be used for purchasing rails and other materials for the western section of the railway. The purchases made are as follows :

First-class and second-class cars, dining cars and sleepers	£40,284
Freight cars	4,190
Railway bridges	14,820
Steel Sleepers	30,432
Railway bridges	28,200
Rails	108,620
Water Feeders	4,490
Telephones...	305
Dining car and sleeper equipment ...	2,440
Pipes	650
Miscellaneous materials	12,300
Locomotives	73,000
Miscellaneous materials	15,600
Miscellaneous materials	14,400

—*Reuter*.

CONSTRUCTION OF TAIYUAN-SHIHKIACHWANG RAILWAY EXTENSION TO TSANGCHOW UNDER CONSIDERATION.—Construction of the Taiyuan-Shihkiachwang Railway Extension to Tsangchow, in northern Hopei, will shortly be started, consequent to an arrangement between Mr. Sun Fo, Minister of Railways, and Mr. Ho. Ya-lung, Managing-Director of the Taiyuan-Shihkiachwang Railway. Director Ho recently arrived here from the Shansi Provincial Capital to confer with Minister Sun in accordance with instructions from General Yen Hsi-shan. The cost of the proposed construction is estimated at $16,000,000. Measures to secure funds have already been formulated.

WORK ORDERED ON NEW SECTION OF CANTON-HANKOW LINE.—Mr. Sun Fo, Minister of Railways, issued instructions on July 4 to the administration, construction and finance departments of the Ministry to start preparations immediately for the completion of the Shaokwan-Lochan section of the Canton-Hankow Railway. A sum of $2,000,000 will be appropriated from the Belgian Boxer Indemnity Funds for the work.

Since a large amount of the materials which will be used in the construction of the line have to be purchased abroad, the above departments of the Railway Ministry were instructed to make an estimate immediately as to what materials will be needed. It will take some time before these can be delivered, so it is thought that the orders should be put in as early as possible.

AGREEMENT BETWEEN MINISTER OF RAILS AND A BRITISH FIRM.—The following are learned to be the salient points in the loan agreement for material to be supplied to the Shanghai-Nanking Railway, which was concluded between Mr. Sun Fo, Chairman of the Railway Department, and the representative of the Anglo-Chinese Corporation on June 21 :

1. Nine locomotives, 24 steel passenger cars, and 100 40-ton steel covered goods cars shall be bought from a British factory, public tenders being received for the same.
2. The amounts of the loan shall be £156,000.
3. Interest is 8% per annum.
4. The loan shall be amortized in 20 months, payment being made every month out of the revenue of the Shanghai-Nanking Railway.
5. The agreement shall become effective when it is sanctioned by the national government.

BELGIAN BOXER FUND FOR ROLLING STOCK.—The Ministry of Railways officially announces to-day that $1,000,000, out of a total of $1,600,000 of the Belgian Boxer Indemnity Fund, will be used for the purchase of new rolling stock for the Tientsin-Pukow Railway. This purchase will include restaurant cars, mail and baggage vans and first and second class coaches. The balance will be used for the purchase of steel goods-wagons to be distributed among the government railways.

Recently, through the Purchasing Commission, the Ministry invited tenders for the supply of ten "Mikado" type locomotives for the Tientsin-Pukow Railway. The selection fell on the Baldwin Locomotive Works, whose agents in China are Messrs. Andersen, Meyer & Co., Ltd. According to the locomotive company, the ten locomotives are being shipped to China by a specially chartered steamer which is due to arrive in China about the end of September. The delivery is to be effected at Tsingtao, where the locomotives can be easily landed and switched on to the Tientsin-Pukow line.

Tenders for 9 locomotives of the "Pacific" type, 100 steel goods-wagons, of 40 tons capacity, and 24 frames for passenger cars are now being invited in London by the British and Chinese Corporation on behalf of the Ministry. The new rolling stock will be for the Shanghai-Nanking and Shanghai-Hangchow lines. The amount involved is approximately £160,000.

INDUSTRIAL

FUJI-NAGATA WILL BUILD TWENTY-FIVE RAILWAY COACHES.—The Fuji-Nagata Shipyard, Osaka, will receive from the railway Department an order for the construction of 25 railway carriages, it has been decided by the authorities, since the revival plan of the firm has taken shape.

OIL FIELDS IN KARAFUTO : Preparations are being made by the Nippon Sekiyu K.K. for prospecting oil fields in South Karafuto, in accordance with the contract recently closed between the Government of Karafuto and the company. The mining office has been established already, and the company is ready to begin operations. According to experts, the oil fields in Karafuto are connected with Niigata and Akita fields, so that it is doubtless that there is a considerable deposit, but it is difficult to ascertain the quantity unless after thorough prospecting. The company must be prepared to repeat failures, for at least two years, before they can succeed, it is reported.

ASAHI SEKIYU K.K.—(Asahi Petroleum Co., Ltd.) The Hikoshima Plant of this company is to be completed before the end of August and operation is to be started in September this year. This company sold the Tokuyama Plant to the South Manchuria Railway Co., Ltd., in April, but before delivering the mill the company had manufactured as much as it could, so that it carries stocks enough to last for the summer slack months. In case the stock runs low, the company will begin operation in the uncompleted plant. The productive capacity of this plant is rated at some 2,000 tons a month, of light oil and various kinds of machine oil. Extensions are to be made gradually, to manufacture other kinds of oil as well.

THE LUNGHWA CEMENT FACTORY.—Along the left bank of the Yangtze River and at some distance from the Lunghwa Station, is located the Lunghwa Cement Factory. The area it covers yields neither limestone nor clay. The Factory was founded in 1921, its initial capital being estimated at $2,400,000. The raw materials for manufacturing cement come down mainly from the Yangtze River.

Clay comes from Zushan, Sunkiang; limestone, from Chenwanshan, Chekiang ; gypsum, from Germany ; and coal, from Annam.

The cost of mining and transporting clay and limestone from the producing district to the Factory is put at one dollar per ton, and that for coal and gypsum at $10 and $15 a ton, respectively, not to mention the numerous expenses involved in the manufacture of cement, which is sold at only $5 a barrel.

Gypsum, a Hankow product marketed at $30 a ton, may be classified into first, second and third grades as the case may be. The first grade is white in color ; the second grade, black ; while the third grade contains quite a bit of impurities. Formerly the management preferred to use the gypsum from Hankow, but owing to its recent rise in price, an African product has been selected as a substitute, largely because it is marketed at only $26 a ton including all expenses. The gypsum from Germany varying from $18 to $15 a ton is extensively used for its cheapness in price as well as its superiority in quality.

Coal ranks as an important material for manufacturing cement, the quality of which largely depends upon the quantity and quality of the coal burned. Technically speaking, soft coal is little used due to the enormous quantity of carbon present during burning. Coals from Kaiping and Changhing are thus discarded while that from Tonking, Annam, is widely used for this particular purpose.

In the factory, there are two furnaces, one grinding machine and three mixing machines with varying degree of usefulness. The furnace is 56 feet in height and 2.32 feet in diameter. And it is estimated that each furnace is capable of turning out 600 barrels of cement within every 24 hours. The mixing machines varying from 50 to 500 horse power are very powerful. Lifts, cranes, transformers and packing machines carrying from 500 to 1,000 horse power are installed in the plant wherever and whenever necessary.

DAI NIHON JINZO HIRYO K.K.—(Japan Artificial Fertilizer Co., Ltd.) Nihon Chisso Hiryo K.K. is the only firm in Japan which is manufacturing synthetic nitrie acid (at the Nobeoka Mill in Kyushu). The output is by far insufficient to meet the demand in this country and the deficit has been imported from foreign countries. In view of this condition, Dai Nihon Jinzho Hiryo K.K. is planning to manufacture it on a large scale. The plan is expected to materialize upon the return of Mr. Oda, engineer, who has been studying on the subject in Europe and America.

TOKUYAMA WAX PLANT OF SOUTH MANCHURIA RAILWAY COMPANY.—The construction of a wax plant of Nippon Seiro K.K. (Japan Wax Manufacturing Co., Ltd.), a subsidiary of South Manchuria Railway Co., Ltd., at Tokuyama (formerly Asahi Sekiyu's factory) is now under way, under the supervision of Mr. Toshimitsu Koyama, factory manager (formerly engineer of the Navy). The necessary machinery is to arrive in Japan about the end of October, so that it will be some time next summer before the plant can be put in operation.

Mr. Shigezo Honda is special managing director of the company, and he is assisted by General Mizutani, formerly of the Fuel Arsenal of the Imperial Japanese Navy.

SHOWA SEIKO K.K.—(Showa Steel Mfg Co., Ltd.) A new company has just been established by the South Manchuria Railway Co., Ltd., known as the Showa Seiko K.K. (Showa Steel Mfg Co., Ltd.).

The company is capitalized at Y.100,000,000, of which Y.25,000,000 is to be paid in for the present. Shares are all to be accepted by the S.M.R. The head office of the company will be located in Keijo, Korea, branch offices in Tokyo, and a mill at Shingishu in Korea.

The mill is to produce sheet bar and billets, annual production rated at 350,000 tons ; also, wire rods, thin sheets (black sheets), and other steel materials, total about 150,000 tons ; grand total 500,000 tons a year.

The management is reported as follows :

President : Takuo Godo (Formerly head of the Naval Arsenal at Kure)

Managing Directors : Senpachi Soejima (Formerly head of the Bureau of Commerce) Shozo Takano (Director of T.K.K.)

Directors : Kwanji Usami (Head of Railway Section, S.M.R.), Tsunero Yamanishi (Head of Fushun Colliery), Kan Chiaki (Head of Anshun Iron Works).

Auditors : Shotaro Iriye (head of Tokyo Office, S.M.R.), Koun Tadokoro (Auditor of S.M.R.), Seiichiro Kobo (head of Business Section, S.M.R.), Kumao Tominaga (head of Supplies Section, S.M.R.)

Business is to be started from 1931, it is reported.

YAWATA WORKS TO GET ORES FROM MALAYA :—The Nippon Mining Company will supply iron ores from Zungung Mine, Trengganu State, Malay Peninsula, to the Yawata Iron Works regularly from June, 1930.

Mr Toshikichi Shimada, Managing Director of the Nippon Mining Company, left Tokyo on June 19 for the Mine to make investigations as to the prospects. Immediately after his arrival, a railway line between that Mine and Trengganu, 18 miles in length, will be constructed.

It is expected that about 300,000 tons of iron ores will be obtained from the Mine annually, and the Yawata Works will take over the total output. The Works is now preparing to conclude a contract with the Nippon Mining Company to buy the ores for coming 20 years. In future the Mine is expected to produce 500,000 tons of ores annually.

The Yawata Works will be able to rely upon the supply of pig iron when the Nippon Mining Company starts operation in the Malay Peninsula. The Yawata Works had been long troubled with the stoppage of supply from the Hanyehping Mine in China due to the Chinese civil war.

The Zungung Mine is situated about 250 miles north of Singapore, the total area of which is about 1,100 acres, in which about 30,000,000 tons of ores, containing 65 per cent. iron, are in the ground there. The term of the lease of that Mine is for 50 years.

SHIPPING AND SHIPBUILDING

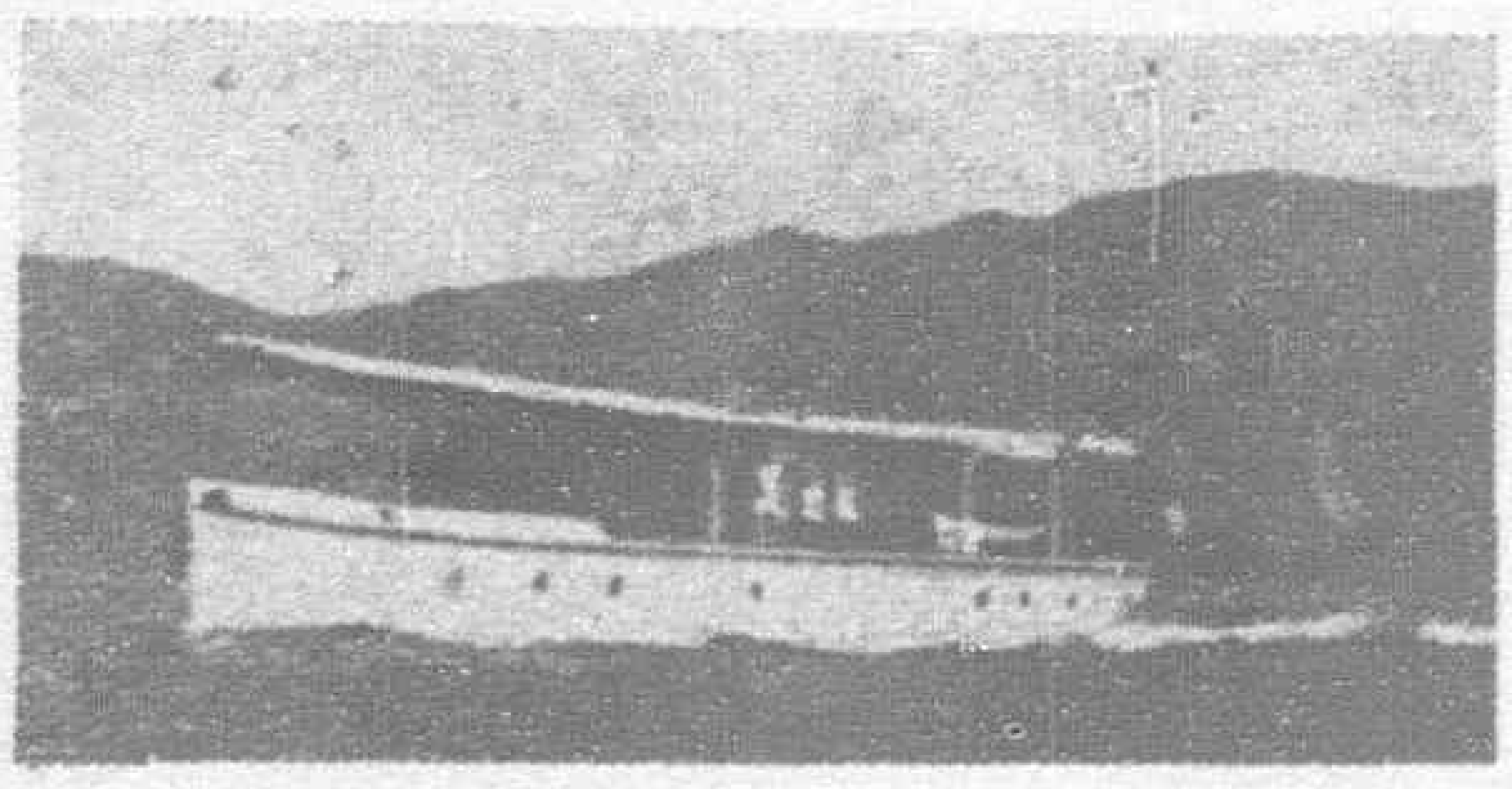
NEW PULVERIZED COAL VESSEL.—Messrs. Yarrow and Co., after carrying out an exhaustive series of experiments, have recently developed a pulverized coal burner and pre-furnace which has proved very successful both for water-tube and cylindrical boilers.

It is of interest to note that Messrs. P. Henderson and Co., Shipowners, Glasgow, in order to investigate the merits of pulverized coal, have arranged for Messrs. Yarrow and Co., to equip half of the boiler installation of the *Amarapoora* with the Yarrow System of pulverized fuel, the pulverizers being of the ATRITOR type manufactured by Messrs. Alfred Herbert Ltd., of Coventry.

The *Amarapoora* is a passenger and cargo steamer of about 8,000 tons which runs between Great Britain and Burma.

THE MOTOR-BOAT : A CHINESE BRITISH-ENGINED LAUNCH.—Feburary 8, 1929 The boat illustrated is the *Lila*, which has been constructed for the Harbor Master's Department at Hongkong, following the general policy of the modernizing of the fleet of boats in Hongkong Harbor.

She has been built by W. S. Bailey & Co., Hongkong, and is equipped with a pair of 72 b.h.p. Gardner four-cylinder oil engines, which are of the direct-reversing type, each driving a circulating pump, bilge pump and air compressor.

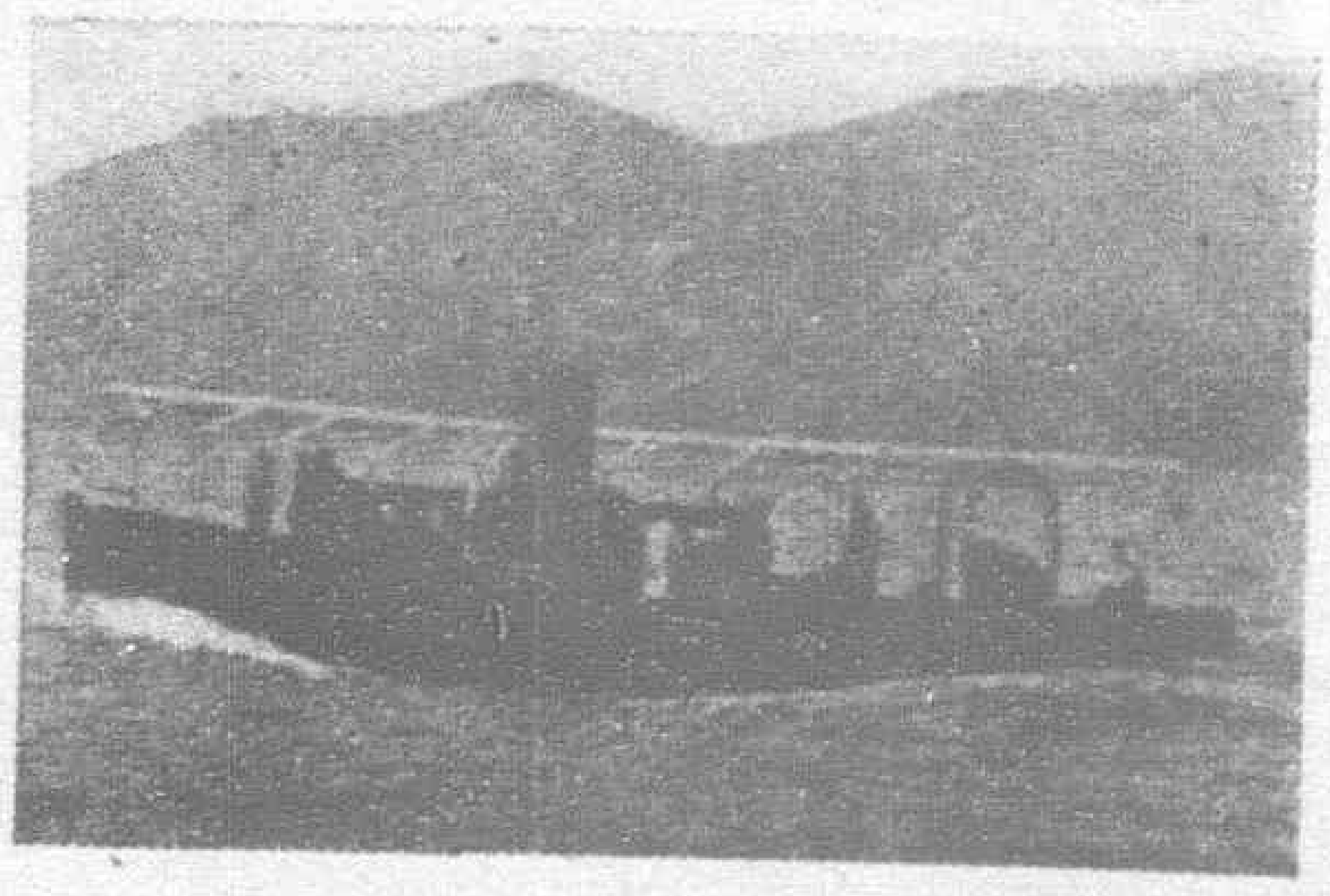


The boat is of teak, 80-ft. long, with a beam of 15-ft., and at each end of the machinery space is a $\frac{3}{16}$-in. steel bulkhead insulated with asbestos 2-ins. thick, and panelled in Philippine mahogany. There is a deckhouse below the stateroom, having spring beds and panelled in mahogany. There is, in addition, a cabin forward, with two sofa berths, and accommodation is provided for the crew. In order to protect the passengers and crew from the heat a full length awning is provided. An auxiliary set comprising a 3 h.p. paraffin engine, coupled to a 1¼ kw. dynamo, is installed. This unit also drives a small air compressor through the medium of a dog-clutch.

THE FIRST JAPANESE SHIP TO SAIL FOR ALASKA.—It is reported that Taiyo Kaiun K.K. (Ocean Shipping Co., Ltd.) has contracted for a shipment of 5,000 tons of scrap iron from Alaska to Japan, freight at some $5 a ton. Alaska is the virgin land for Japanese steamers to touch. Taiyo Kaiun expects to despatch its vessel some time before the end of July, as there will not be enough space after September.

It is uncertain whether shipments will continue from that part of the world to Japan, but if the demand for scrap iron continues active and American lumber shipments inactive, more demand for Japanese vessels on Alaska line is expected.

A HONGKONG HARBOR LAUNCH WITH A BRITISH ENGINE.—There has just been supplied to the Harbor Department at Hongkong a 50-ft. service launch built by the Hongkong and Whampoa Dock Co. The beam is 11-ft. 3-in. and the draught 6-ft., while the service speed of 9½ knots is maintained. She is equipped with a 72 h.p. Gardner oil engine running at 400 r.p.m. Starting air is obtained from a petrol-engine-driven compressor supplying three air receivers.



A New Hongkong British-engined Harbor Launch

TELEPHONE, TELEGRAPH AND RADIO

CHINESE WIRELESS TELEGRAPH SERVICE.—The Chinese authorities have laid a wireless telegraph service between Wuhutsui and Fuchou, just north of Kwantung Leased Territory. An official who came to inspect the new installation intimated that it was chiefly for military use.

CHINESE LONG DISTANCE TELEPHONES.—In North Manchuria, the Chinese long distance telephone systems comprised the Heilungkiang, the Mukden-Kirin-Heilungkiang, the Harbin-Manchouli-Suihua, and the C.E.R. systems, each being an independent unit. There is no unity in their respective workings and Director Chiang of the Northeastern Electricity Administration, Mukden, on his present visit to Harbin, has made Chen-chiachen, Superintendent of the Harbin Telephone Office, additionally Director of the North Manchuria Long Distance Telephone Office. The Harbin Office has been made the general offices, the other offices being made its branches. In transmission of messages, the Harbin general offices are made the central station. The public may carry on traffic with freedom at any of the offices. New branches may be opened at suitable points. The charges are to be tabulated. Connection are to be effected with the local telephone service.

PUBLIC WORKS

HARBOUR WORKS PLAN AT TACHINGHO.—According to investigations in a reliable quarter, the harbour works plan at Tachingho (about midway between Taku and Chinwangtao on the Gulf) is under weigh at the hands of a number of U.S. capitalists. In view of the improvement of the Tientsin Harbour facility being beset with grave difficulty, the practically settled situation in China might be making the U.S. capitalists itch for sound investment in China and the above report may not be all a hoax. The construction plan is nothing new, but very much after the American concrete design drawn up some seven years ago. According thereto, the bar at the mouth of the Taching is to be turned into a breakwater, and a well appointed harbour is to be created with proper landing or unloading equipments. Starting therefrom, the Peiping-Mukden Line track is to be crossed by a new line that will get to Chihfeng. Another will run from Chaoyang to Jehol. These railways will absorb the products of Manchuria and Mongolia and North China. Geographically speaking, Tachingho is far better situated than Chinwangtao and is further ice-free. Should the plan take form, it is worth following carefully.

HANKOW-WUCHANG BRIDGE.—According to a proposed project of the Ministry of Railways, a steel bridge to span the River and connect Hankow with Wuchang will be constructed as soon as funds therefore are available. The bridge will be about thirty-five feet in width and consist of over fifty sections. Besides bearing a double track for the trains on the Canton-Hankow Railway, there will be sufficient space for motor traffic. The estimated cost of the construction will be twenty million dollars ($20,000,000).

SHOKAWA DAM NEAR COMPLETION.—The construction of a dam 260 feet high on the Skokawa River, Japan, is now nearly completed. During the last three years this dam has been a problem among the lumber men in Gifu and Goyama Prefectures, but the question still remains unsettled.

POWER DEVELOPMENT PLANNED AT TAZAWA LAKE IN AKITA PREFECTURE.—Electric power generation is planned by utilizing the water of Tazawa Lake in Akita Prefecture, Japan. Power to be generated is rated at 40,000 k.w., the cost of construction estimated at some twenty million yen. The necessary license has been applied for by the Hokkaido Dento K.K. (Hokkaido Electric Light Co., Ltd.) and the Morioka Denki K.K. (Morioka Electric Co., Ltd.).

The scheme is considered important in view of the size of development in that district. Tazawa Lake is noted for its scientific value and beautiful scenery which surrounds it. It is the second deepest lake in the world, though the circumference is only about five "ri" (or some 12.5 miles). Also it is well-known for the purity of its water.

BUILDINGS

NEW KOBE NATIONAL CITY BANK BUILDING.—A new Y.300,000 home for the Kobe office of the National City Bank of New York is complete for occupation.

The new building, which stands in the Akashimachi-Nakamachi corner in the quondam Foreign Settlement, has been constructed in accordance with the requirements of the American bank constructed by the Catholic Mission of Kobe, owners of the former brick building, which used to be occupied by the same bank and which was partially destroyed by a fire on October 19, 1927.

MINING

DISCOVERY OF GOLD IN CHICHIBU.—Mr. Nakayama Masaaki, lecturer to the Agricultural Department of the Tokyo Imperial University, who is in charge of the Chichibu experimental plantation is reported to have located a rich vein of gold in the plantation on the Chichibu range. The vein starts at Akazawa on the Jumonji Pass, near Otakimura, Chichibu-gun, running towards the Nakatsugawa in the north-east and over eight miles along the vein of quartz. The discoverer mined some of the ore and sent it to the Tokyo University to be assayed. That the River Arakawa abounds in gold dust has been known to mineralogists for many years, while the mining of gold was in progress on the range from the days of Takeda Shingen till the end of the Tokugawa Shogunate. It is said, however, that the vein discovered is quite different one from those worked in the old days.

ROADS

THE PROPOSED SHANGHAI SUNGKIANG MOTOR ROAD.—The construction of a motor-road connecting the district of Shanghai with Sungkiang, to run parallel to the Shanghai-Hangchow Railway, is under consideration by the Shanghai District Government.

PROPOSED CONSTRUCTION OF INDUSTRIAL ROAD IN YUNNAN, CHINA.—The construction of a 25-mile road in southeastern Yunnan Province (extreme southwestern China) to connect the tin mining and smelting center of Kotchiu with the treaty port of Mengtsz and with Pishihchai, stations on the Haiphong-Yunnanfu Railway, is being contemplated by the Yunnan Kotchiu Tin Trading Co. of Kotchiu, Yunnan. This firm is the largest factor in the important tin mining and refining industry in this Province.

The first section of the road, about 10 miles in length, is to be constructed from the town of Kotchiu, over a mountain range to a lake, on which water connection with the main railway line can be established. It is hoped to complete this portion of the road—the only part of the route presenting serious engineering difficulties—during 1929.

The remainder of the proposed highway, the need for which is less urgent, is to be built across a plain through Mengtsz, the most important town in southeastern Yunnan, to Pishihchai, as circumstances warrant.

The road is to be 7 meters (23 feet) in width, with a maximum grade of 5 per cent. (This grade is likely to be exceeded in crossing the mountain range). Other details of construction have not been definitely determined, but as the road will be used primarily by tractors, it is probable that there will be little surfacing. It is unlikely that foreign materials will be used to any appreciable extent. The estimated cost of the project is not given. While the road will be built largely by manual labor, a limited quantity of simple highway construction machinery probably will be utilized.

When the first section of the road is completed from Kotchiu to the lake the management of the Yunnan Kotchiu Tin Trading Co. intends to operate heavy 5 to 10 ton tractors, with trailer trains, over the mountain grades. A small fleet of light American tractors is now owned by this concern but will not be suitable for the heavy duty contemplated. Heavy tractors will be purchased for this purpose, and the lighter type will be used on the more level sections of the route.

Cargo at first will be transported across the lake in boats (possibly launches and barges)—a distance of some 10 miles—to Pishihchai on the main-line railway. When ultimately this section is completed, carriage will be effected by tractors with trailers only, eliminating the water route.

Coal and other supplies from the railway, for use in the mining and smelting operations at Kotchiu, will constitute the bulk of the traffic handled, although tin slabs, the product of the district, will be shipped out by the same route.

While the building of the road will be the private undertaking of the Yunnan Kotchiu Tin Trading Co., for its own use, when completed it will doubtless facilitate the use of automotive vehicles generally in a section that at present is utterly devoid of motor highways. It may therefore be expected to form a link in the modern road system that is slowly being developed in this Province.

Firms desirous of making connection with the Yunnan Kotchiu Tin Trading Co. should address communications to that concern at Kotchiu, Yunnan China, attention of Dr. W. W. Lee, vice president.

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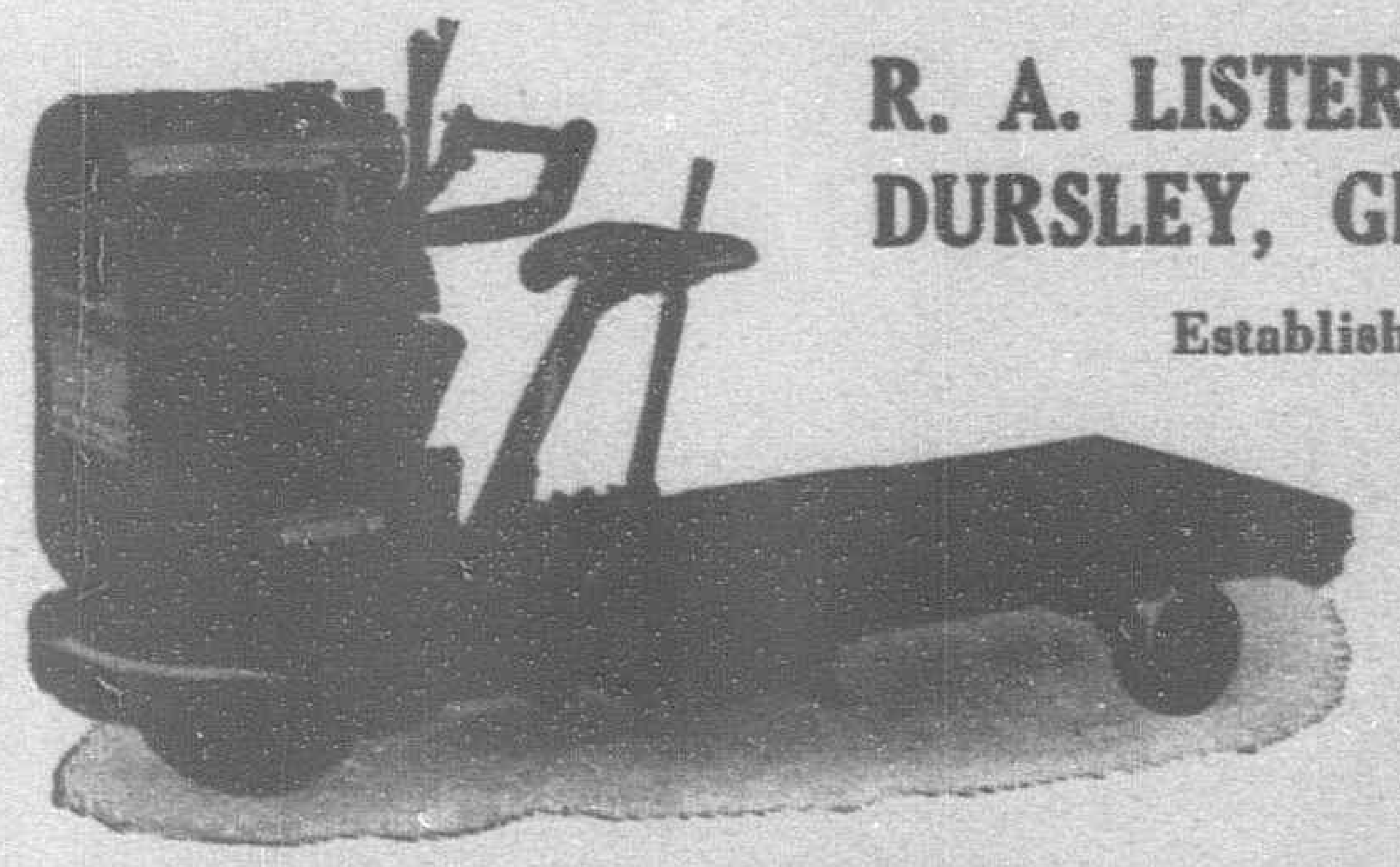

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STATISTICS ON COMPLETED MODERN HIGHWAYS.—The following is a list showing in total the number of modern roads together with their total mileage in the various provinces of the country :

Name of Province	*Number of Roads*	*Total Mileage*
Kiangsu	26	2,953 *li*
Chekiang	17	1,093 ,,
Kwangtung	29	4,802 ,,
Kwangsi	13	1,550 ,,
Hunan	5	1,063 ,,
Hupeh	16	3,502 ,,
Fukien	27	2,163 ,,
Honan	63	7,045 ,,
Hopei (Chihli)	31	4,497 ,,
North-western provinces .	7	7,381 ,,
Kansu	3	704 ,,
Szechuan	7	915 ,,
Kiangsi	2	235 ,,
Shansi	9	2,400 ,,
Kirin	3	311 ,,
Shensi	1	290 ,,
Anhwei	12	1,410 ,,
Shantung	24	2,672 ,,
Liaoning	3	1,030 ,,
Yunnan	2	133 ,,
Kweichow	2	1,550 ,,
Sikang	2	999 ,,
Kiaochow	1	600 ,,
Total	305	49,298 *li*

It should be noted that the foregoing figures are by no means comprehensive. They do not include those roads under construction at the time when the above statistics were taken. Therefore, should we include such figures in the above data, the total mileage of completed modern highways in China would be considerably increased. For certain, motor roads have come to stay in this country and will become increasingly popular as time goes on.

AVIATION

GOVERNMENT AIR MAIL SERVICE.—At a conference attended by postal authorities and officials of the Ministry of Communications, a resolution was passed to the effect that, weather conditions permitting, the Shanghai-Nanking air-mail and passenger service was officially inaugurated on July 8. For the time being, only one flight will be made daily from Shanghai to Nanking and *vice versa*. Each plane will have a carrying capacity for four passengers exclusive of space for parcel post and mail matters. The tariff governing passenger service is tentatively set at $30 for a single trip, and the suggestion is that this line will not be operated until sufficient trial has been given to popularize it. The number of flights to be made daily will be increased as commercial aviation becomes better established in China. According to the mailing schedule to be put into operation, the air-mail for Nanking will close at the Shanghai Office at 10.30 a.m., all mail matters leave the Head Office at 11 a.m., and the plane departs from the Hungjao Airdrome at noon, arriving at Nanking at 2 p.m. Dispatching begins at 2.15 p.m. The plane for the return trip will go by another schedule. The air-mail will leave the Chi Fan Ka Office, Nanking, at 1.30 p.m., and the plane is to take off at 2 p.m. sharp, landing at the Hungjao field at 4.50 p.m. Delivery of air-mail from Nanking will commence at 5 p.m.

The schedule is so worked out as to fit in very well with the Shanghai-Nanking night express train schedule, enabling either senders or receivers of letters by air-mail either at Nanking or Shanghai to obtain replies from parties concerned in the minimum amount of time possible.

As usual, the air mail matter will be accepted according to the existing system as far as classification of mails goes, save that the tariff of postage has been readjusted. Each plane is capable of carrying a little over 1,000 pounds. Letters, post-cards, newspapers, printed matter, parcels, etc. will be sent in the order of preference, the present policy being to give every facility to mail carriage.

The service will be extended to Hankow and later to Chengtu when necessary. Attempts at laying out airdromes at Anking, Wuhu, Kiukiang, Ichang, Wanhsien and Chungking for aeroplanes to alight during flights to Chengtu in times of bad weather and emergency will soon be made. To facilitate landing on water, skids or "floats" will be attached to mail planes.

Letters or money orders for delivery by air-mail will bear special postage in addition to the regular charges applicable to ordinary mail. The rates as announced by the postal authorities are as follows :

Letters : 15 cents per 20 grammes or fraction thereof.

Postcards : 15 cents for a "single" postcard.

Postcards : 30 cents for a "double" postcard.

General mail matters : 15 cents per 50 grammes or fraction thereof.

Parcels : up to 1 kilo, 60 cents each kilo., after the first kilo. (limit 10 kilos.) 30 cents.

Money Orders : 50 cents for $100 or fraction thereof.

Acknowledgement of Payment : 15 cents.

Acknowledgement of Receipt : any article, 15 cents.

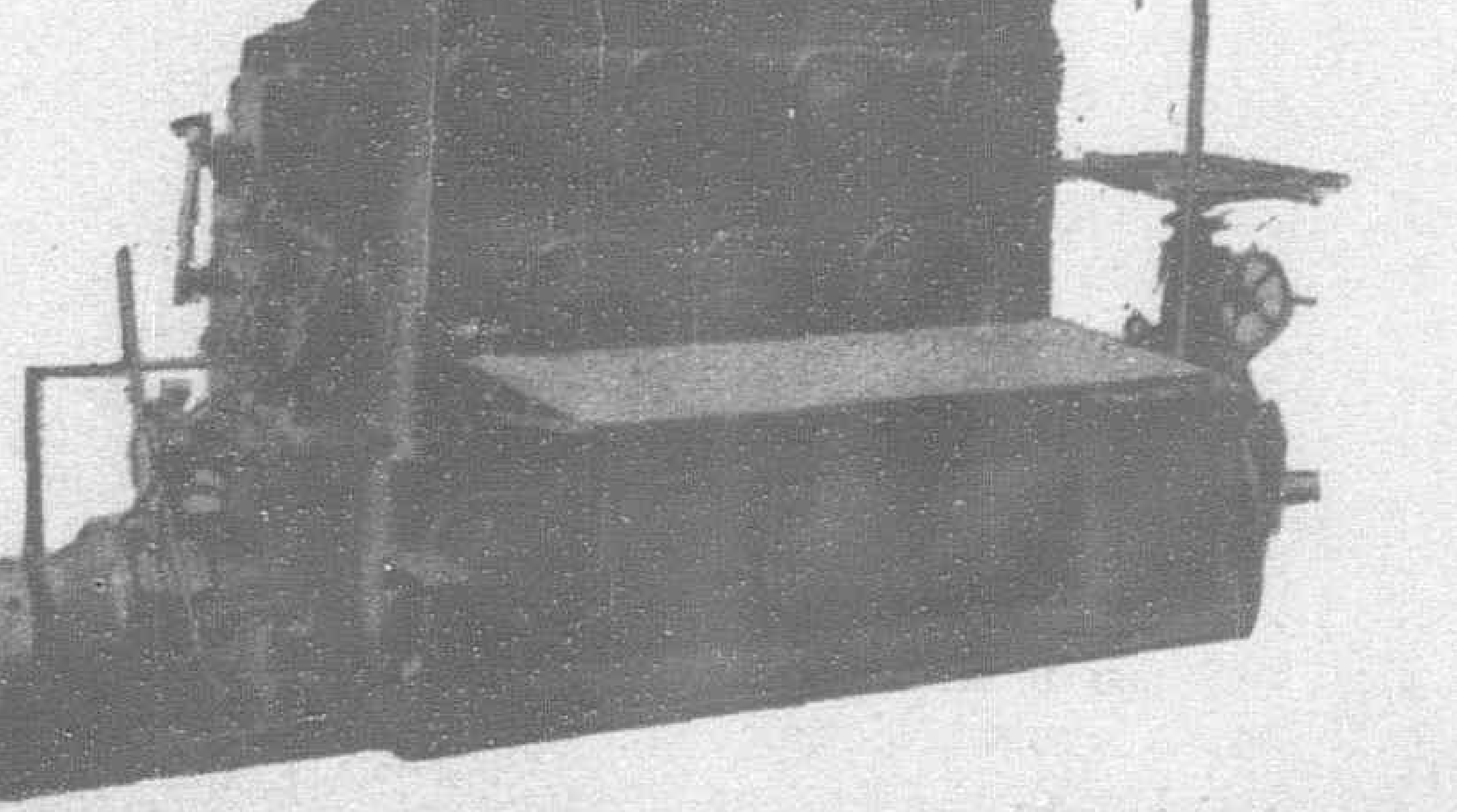
The air-mail stamps will be in denominations of 15, 30, 45, 60 and 90 cents. In the interest of those people who are after souvenirs, a special dater will be used for marking off air-mail stamps, and this will be discontinued after July 10, 1929, when postmarking will be by the ordinary dater.

SULZER
BROTHERS

SHANGHAI ENGINEERING OFFICE
4 AVENUE EDWARD VII.

Telegraphic Address
"SULZERBROS" SHANGHAI
Telephone 16512

蘇爾壽工程事務所
上海愛多亞路四號
本公司常備樣本供奉各界
垂詢工程事務亦局誠酬答



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